RFID DEMO APPLICATIONS
USER GUIDE

RFID DEMO APPLICATIONS USER GUIDE

72E-160038-01

Revision A

May 2012

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Warranty

For the complete Motorola hardware product warranty statement, go to:
http://www.motorola.com/enterprisemobility/warranty.

Revision History

Changes to the original guide are listed below:

Change	Date	Description
-01 Rev A	5/2012	Initial release

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Tell Us What You Think...

ABOUT THIS GUIDE

Introduction

The *RFID Demo Applications User Guide* provides general instructions for using sample applications which demonstrate the capabilities of Motorola fixed and handheld RFID readers and how these features can be used in everyday applications.

Chapter Descriptions

Topics covered in this guide are as follows:

- *Chapter 1, Getting Started* introduces the RFID demo applications which demonstrate the capabilities of Motorola fixed and handheld RFID readers.
- *Chapter 2, RFID Sample Application* provides an overview of the RFID application CS_RFID3Sample6.exe which assists application developers in developing custom applications for handheld RFID devices.
- *Chapter 3, Tag Locator* describes the Tag Locator application which is used on handheld RFID devices to detect the relative position of tags.
- *Chapter 4, SessionOne* describes the SessionOne PC-based application used to discover and connect to Motorola fixed and handheld RFID readers, specifically the FX7400, FX9500, MC3x90-Z, and MC9x90-Z.
- *Chapter 5, PowerSession* describes PowerSession, a multi-reader, PC-based application used to discover and connect to Motorola fixed and handheld RFID readers, specifically the FX7400, FX9500, MC3x90-Z, and MC9x90-Z.
- *Chapter 6, RapidRead* describes RapidRead, an application used on handheld readers to demonstrate inventory, asset counting, tag writing and item locating, specifically the MC3x90-Z and MC9x90-Z.

Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight the following:
  - Chapters and sections in this and related documents
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
- **Bold** text is used to highlight the following:
  - Key names on a keypad
  - Button names on a screen.
- bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
- Throughout the programming bar code menus, asterisks (*) are used to denote default parameter settings.

Related Documents

Refer to the *Product Reference Guide* for the fixed or handheld RFID reader for product-specific information.

For the latest version of this guide and all Motorola guides, go to: http://www.motorolasolutions.com/support.

Service Information

If you have a problem using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Motorola Solutions Global Customer Support Center at: http://www.motorolasolutions.com/support.

When contacting Motorola Solutions support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Motorola responds to calls by e-mail, telephone or fax within the time limits set forth in service agreements.

If your problem cannot be solved by Motorola Solutions support, you may need to return your equipment for servicing and will be given specific directions. Motorola is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your business product from a Motorola business partner, please contact that business partner for support.

CHAPTER 1 GETTING STARTED

Introduction

The RFID demo applications demonstrate the capabilities of Motorola fixed and handheld readers. This guide provides specific information about the following applications:

- RFID Sample Application
- Tag Locator
- SessionOne
- PowerSession
- RapidRead

System Requirements

Table 1-1 includes system requirements for the RFID demo applications.

Table 1-1 *RFID Demo Application Requirements*

Demo Application	Devices Supported	Application Type	OS Requirement
RFID Sample Application	MC3090-Z, MC3190-Z, MC9090-Z	Handheld application	Windows Mobile 6.x
Tag Locator	MC3090-Z, MC3190-Z, MC9090-Z	Handheld application	Windows Mobile 6.x

Table 1-1 *RFID Demo Application Requirements*

Demo Application	Devices Supported	Application Type	OS Requirement
SessionOne	FX7400, FX9500, MC3090-Z, MC3190-Z, MC9090-Z	Single reader application	Windows XP 32-bit, 64-bit; Windows 7 32-bit, 64-bit
PowerSession	FX7400, FX9500, MC3090-Z, MC3190-Z, MC9090-Z	Multi-reader application	Windows XP 32-bit, 64-bit; Windows 7 32-bit, 64-bit
RapidRead	MC3090-Z, MC3190-Z, MC9090-Z	Handheld application	Windows Mobile 6.x

CHAPTER 2 RFID SAMPLE APPLICATION

Introduction

The RFID Application CS_RFID3Sample6.exe provides an overview of how the application works and assists application developers in developing custom applications.

The RFID handheld reader can read, write, lock, kill, and program Gen2 tags. Each tag contains the EPC number (64 or 96 bits), CRC, and kill code. The handheld reader can also collect data by decoding in-range EPC Gen2 RFID tags.

Initiating the read command within the sample application causes the handheld reader to interrogate all RFID tags within the radio frequency (RF) field of view. The reader captures data from each new tag and adds it to the list box in the **EPC ID** window. Select **Stop Read** to stop interrogating tags.

Launching the RFID Sample Application

Select **RFID Demo** in the **Start** menu to start the RFID sample application.

Figure 2-1 *RFID Demo Icon*

Figure 2-2 *RFID Sample Application Window*

In the sample application window:

- Tap the **Start Reading** button to initiate the tag read. Tap **Stop Reading** to terminate tag reading.
- Use the **Mem Bank** drop-down to select a tag memory bank to read. The default memory bank is EPC (**None**). Other options are **TID**, **Reserved**, and **User**.

Connection

Tap **Connection** to display the reader IP and port number.

Figure 2-3 *Connection Window*

Select **Disconnect** to disconnect the reader.

Capabilities

Select **Menu > Capabilities** to view the capabilities of the connected reader.

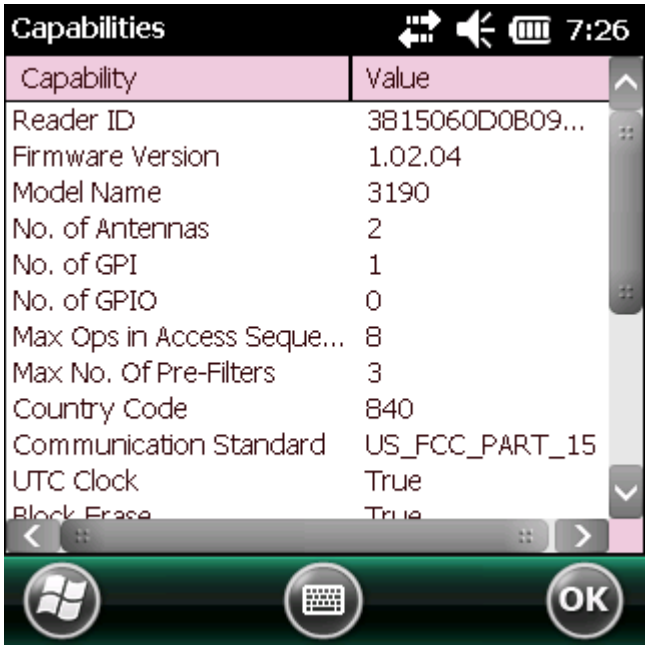

Figure 2-4 *Capabilities Window*

Configuration Menu Options

The Configuration menu includes the following options:

- Tag Storage Settings
- Antenna
- RF Mode
- Singulation
- Power On/Off Radio
- Reset to Factory Defaults

Tag Storage Settings

Select **Menu > Config > Tag Storage Settings** to view/configure tag storage settings.

Figure 2-5 *Tag Storage Settings Window*

This window includes the following fields:

- **Maximum Tag Count** - The maximum number of tags to store in the DLL.
- **Max Tag ID Length** - The maximum tag length.
- **Max Size of Memory Bank** - Storage to allocate for the memory bank's data.
- **Apply** - Select to apply the configuration changes.

Antenna

Select **Menu > Config > Antenna** to view/configure the antenna.

Figure 2-6 *Antenna Configuration Window*

This window includes the following fields:

- **Antenna ID** - Selecting an antenna ID updates the configuration values in the other fields.
- **Receive Sensitivity (dB)** - Lists the reader-supported values for the selected antenna.
- **Transmit Power (dBm)** - Lists the reader-supported values for the selected antenna.
- **Hop Table Index** - Updates the Hop Frequency list with its corresponding frequencies.
- **Apply** - Select to apply the configuration changes.

RF Mode

Select **Menu > Config > RF Mode** to view/configure the RF mode for each antenna.

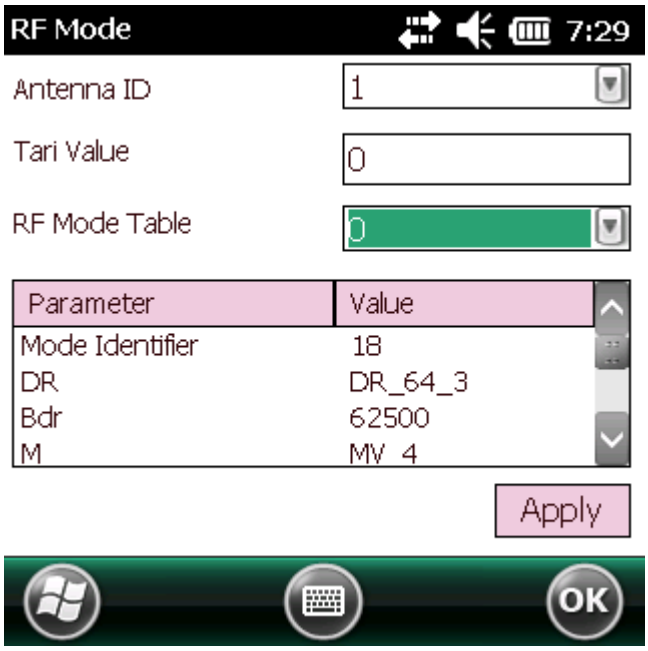

Figure 2-7 *RF Mode Window*

This window includes the following fields:

- **Antenna ID** - Selecting an antenna ID updates the configuration values in the other fields.
- **Tari Value** - TARI specified in nsec.
- **RF Mode Table** - RF mode table configured for the current antenna.
- **Apply** - Select to apply the configuration changes.

Singulation

Select **Menu > Config > Singulation** to view/configure the singulation control settings for each antenna.

Figure 2-8 *Singulation Control Settings Window*

This window includes the following fields:

- **Antenna ID** - Selecting an antenna ID updates the configuration values in the other fields.
- **Session** - The session number for the inventory operation.
- **Tag Population** - The approximate tag population in the RF field of the antenna.
- **Tag Transit Time** - The time in milliseconds that the tag typically remains in the RF field of the antenna.
- **State Aware** - Indicates if the antenna performs state aware or state unaware singulation.
- **Inventory State** - Select a tag of state A or B. Valid only for State Aware singulation
- **SL Flag** - Valid only for State Aware singulation
- **Apply** - Select to apply the configuration changes.

Power On/Off Radio

Select **Menu > Config > Power On/Off Radio** to change the power settings of the RFID radio.

Figure 2-9 *Radio Power Settings Menu*

Reset to Factory Default

Select **Menu > Config > Reset to Factory Default** to restore the default reader configuration.

Operations Menu Options

The **Operations** menu includes the following options:

- Antenna Info
- Filter
- Access
- Triggers

Antenna Info

Select **Menu > Operations > Antenna Info** to view/configure the list of antennas that can be used for inventory/access operations.

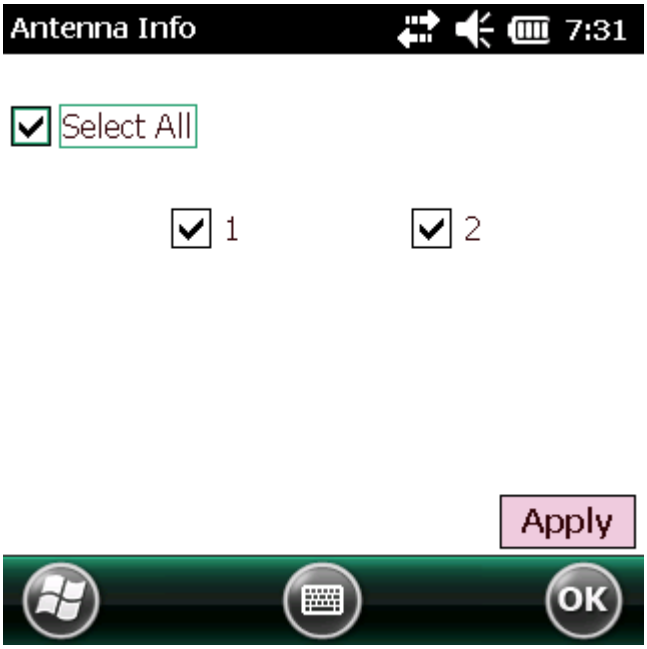

Figure 2-10 *Antenna Info Window*

Filter

Select **Menu > Operations > Filter** to view/configure the following filters:

- Pre-Filter
- Post-Filter
- Access-Filter

Pre-Filter

Select **Menu > Operations > Filter > Pre-Filter** to view/configure pre-filters.

Figure 2-11 *PreFilter Window*

This window includes the following fields:

- **Antenna ID** - Selecting an antenna ID updates the configuration values in the other fields.
- **Memory Bank** - Memory bank on which the filter is applied.
- **Offset** - The first (msb) bit location of the specified memory bank against which to compare the tag mask.
- **Tag Pattern** - The pattern against which to compare the specified memory bank.
- **Filter Action** - Select the required filter action. For more information, refer to the Gen2 specification available at http://www.epcglobalinc.org/standards/.

Post-Filter

Select **Menu > Operations > Filter > Post-Filter** to view/configure post-filters.

Figure 2-12 *PostFilter Window*

This window includes the following fields:

- **Memory Bank** - Memory bank on which the filter is applied.
- **Offset** - The first (msb) bit location of the specified memory bank against which to compare the tag mask.
- **Tag Pattern** - The pattern against which to compare the specified memory bank.
- **Tag Mask** - The bit mask to facilitate bit wise filtering.
- **Match Pattern** - Select the tag pattern to match (A, B, both, or neither).

Access-Filter

Select **Menu > Operations > Filter > Access-Filter** to view/configure the access-filters.

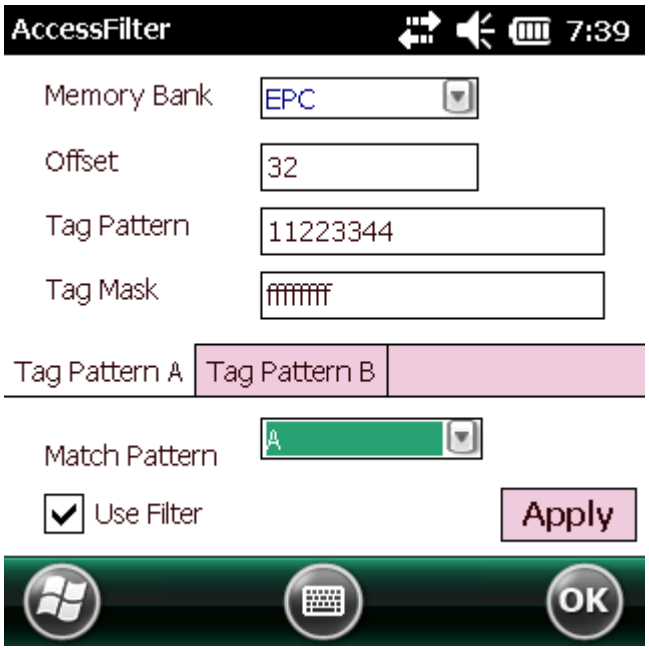

Figure 2-13 *AccessFilter Window*

See *Post-Filter on page 2-12* for field descriptions.

Access

Select **Menu > Operations > Access** to perform the following access operations.

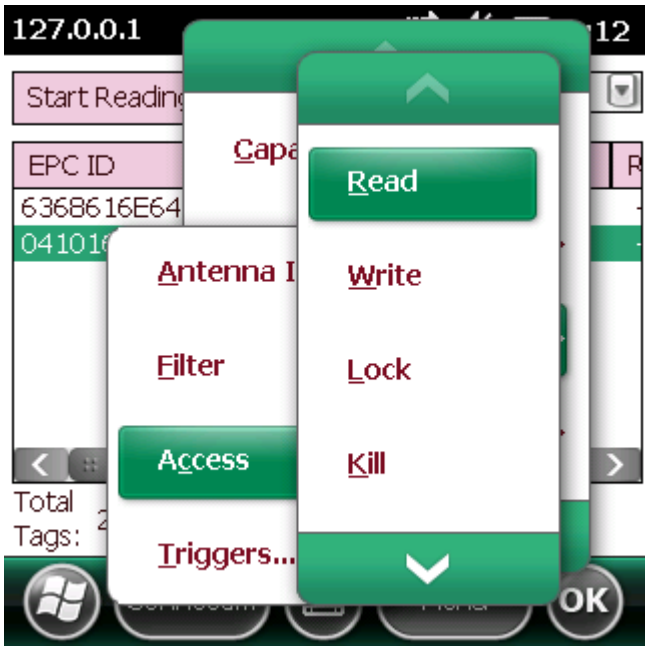

Figure 2-14 *Access Menu*

The **Access** menu includes the following options:

- Read
- Write
- Lock
- Kill
- Block Write
- Block Erase

To perform an access option on a single tag, right-click the tag in the list of read tags on the main window to invoke the tag's context menu.

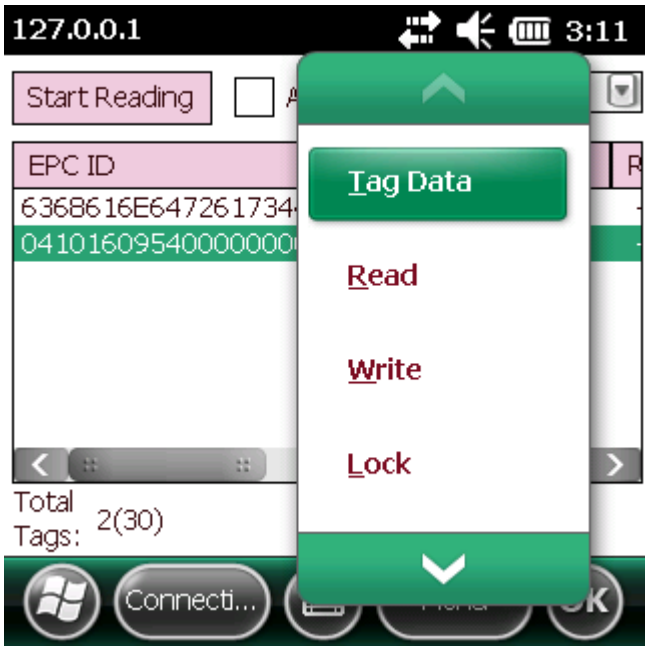

Figure 2-15 *Tag Context Menu*

Access Operation Windows

The access operation windows include the following fields. Set options as required in the various parameter windows. Not all windows include all options.

- **Tag ID** - The name of the selected tag.
- **Password** - Set a password before performing any access operation (except Kill).
- **Memory Bank** - Select the memory bank (Reserved, EPC, TID, User)
- **Offset** - Offset of the first word to read from the selected memory bank.
- **Length** - Tag/data length.
- **Write Data** - The data to write to the selected tag (Write window only).
- **Lock Privilege** - Access options for the selected tag (Write window only):
  - **None** - The can not change the lock privilege of the particular memory bank.
  - **Read_Write** - The user can read and write to the tag.
  - **Perma_Lock** - Permanent lock.
  - **Perma_Unlock** - Permanent unlock.
  - **Unlock** - The user can unlock the tag for writing.

Figure 2-16 *Read Access Operation Window*

Figure 2-17 *Write / Block-Write Access Operation Window*

Figure 2-18 *Lock Access Operation Window*

Figure 2-19 *Kill Access Operation Window*

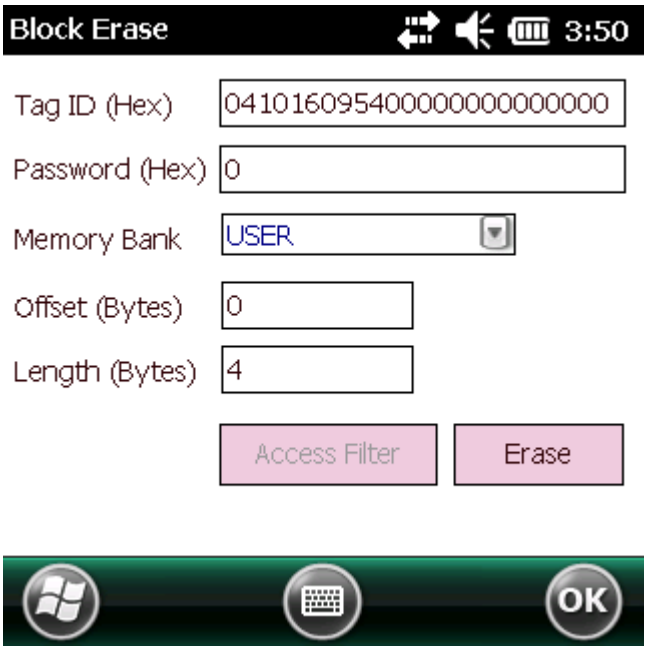

Figure 2-20 *Block Erase Access Operation Window*

Triggers

Select **Menu > Operations > Trigger** to view/configure the following triggers:

- Start Trigger
- Stop Trigger
- Report Trigger

Start Trigger

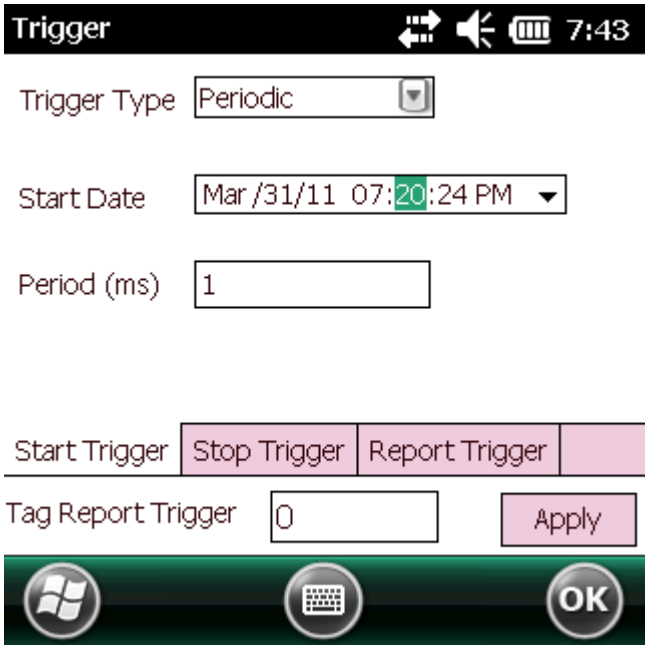

Figure 2-21 *Start Trigger - Periodic Window*

Figure 2-22 *Start Trigger - GPI Window*

Figure 2-23 *Start Trigger - Handheld Trigger Window*

Stop Trigger

Figure 2-24 *Stop Trigger - Periodic Window*

Figure 2-25 *Stop Trigger - GPI with Timeout Window*

Figure 2-26 *Stop Trigger - Tag Observation with Timeout Window*

Figure 2-27 *Stop Trigger - N Attempts with Timeout Window*

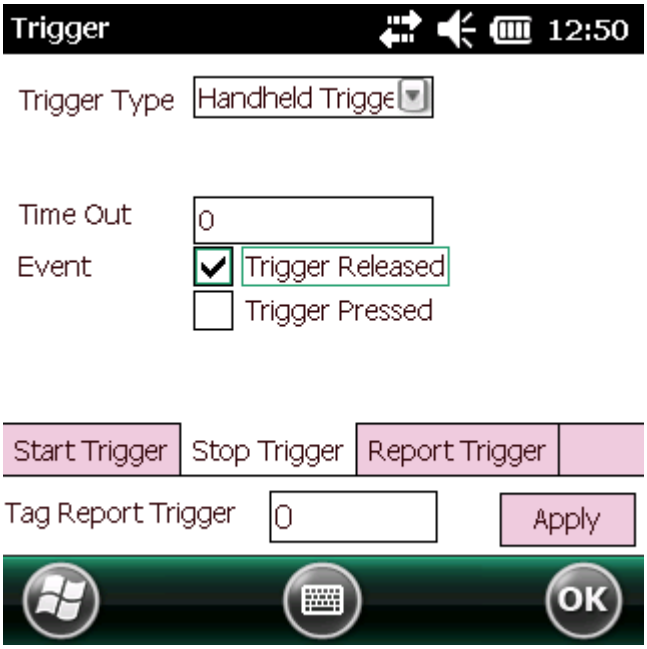

Figure 2-28 *Stop Trigger - Handheld Trigger with Timeout Window*

Report Trigger

Figure 2-29 *Report Trigger Window*

Management Menu Options

Management options are not applicable for handheld readers.

Help Menu

Select **Menu > Help** to display the version information. The version numbers displayed in this window are examples. Actual version numbers are based on the versions of the files on the device.

Figure 2-30 *Help Window*

Exit

Select **Menu > Exit** to exit the RFID sample application.

CHAPTER 3 TAG LOCATOR

Introduction

Use Tag Locater to detect the location of a tag. By providing the TagID of an item, this application can find the relative position of the tag with respect to the handheld reader. Slowly move the handheld back and forth. Use the beep frequency and vertical progress bar on the screen to help direct you to the general location of the tag.

The Tag Locater application requires the following components/DLLs on the device:

- RFIDAPI32.dll (Version 5.1.15 or higher)
- Symbol.RFID3.Device.dll (Assembly version 1.1.0.1, File version 1.1.0.7 or higher)
- Symbol.Audio.dll
- Symbol.dll
- Symbol.Notification.dll
- Symbol.StandardForms.dll

Using Tag Locator

To use the Tag Locator application:

1. Tap **TagLocator** in the **Application** folder on the handheld reader to open the Tag Locater application.

Inventory Reader: 12:08 ok
TagID:
OR
Press & Hold the Trigger and Move the Device Around to Identify Nearby Products or Click on "Import Tags" button to load Tag IDs from file
Import Tags
Search Tags
View

Figure 3-1 *Tag Locator*

2. Enter the tag ID in one of three ways:
   - Type the tag ID in the **TagID** text box, then select **Locate** or press and hold the trigger.
   - Perform a search operation by selecting the **Search Tags** button or by pressing and holding the trigger.
   - Select the **Import Tags** button to import a list of saved tags from a .csv file. See *Locating Tags Using a .csv File on page 3-3*.

Locating Tags Using a .csv File

1. Select the **Import Tags** button to import a list of saved tags from a .csv file. The following window appears.

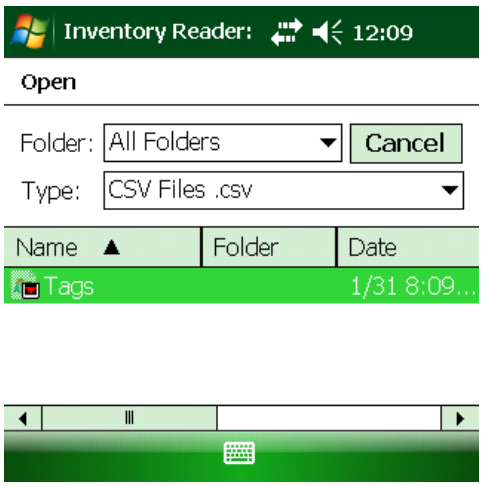

Figure 3-2 *Opening a .csv File*

2. Select the desired .csv file to import the tags to the list.

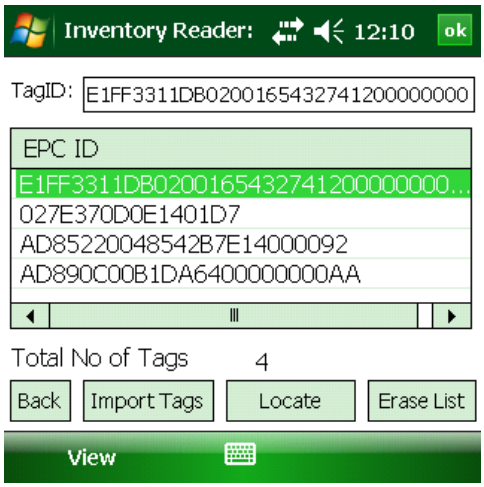

Figure 3-3 *Tag List*

3. Select a tag from the list to search.

4. Select the **Locate** button or press and hold the trigger. Move the handheld reader in all directions to find the relative position of the tag, indicated by a beep, the vertical progress bar, or both.

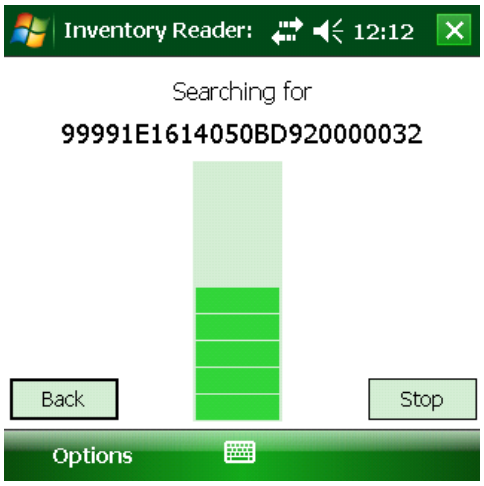

Figure 3-4 *Tag Search*

Use the **Options** menu to turn the beeper on and off and to display data in ASCII or hexadecimal format.

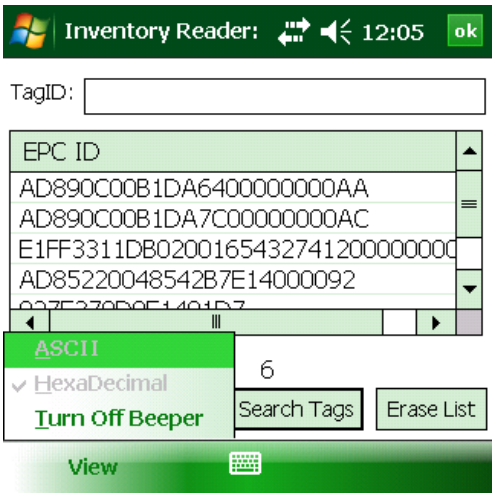

Figure 3-5 *Options Menu*

CHAPTER 4 SESSIONONE

Introduction

SessionOne is a single reader, PC-based application used to discover and connect to Motorola fixed and handheld RFID readers, specifically the FX Series Fixed Readers and MC Series Handheld Readers. This tool allows users to easily perform tag inventory and access operations.

Installation

To install SessionOne on the host PC:

1. Locate **SessionOne** at www.motorolasolutions.com/support.
2. Download the **SessionOne** zip file to the host PC and unzip the file.
3. Double-click the **sessiononesetup.exe** file.
4. Follow the screen prompts to complete installation.

Connecting to the RFID Reader

To connect to the reader through SessionOne:

1. Connect the reader to the host PC. Refer to the reader's *Product Reference Guide* for instructions.

> ***NOTE*** If connecting to the host PC via a USB cable, note the following:
> - For the FX7400, ensure the USB mode is set to Network (the default mode). If the USB mode is ActiveSync, use the Administrator Console to change it to Network before connecting to the host PC.
> - For handheld readers, synchronize the device with the host PC.

2. Select **SessionOne** from the host PC **Start** menu to launch the application. The registration window appears.

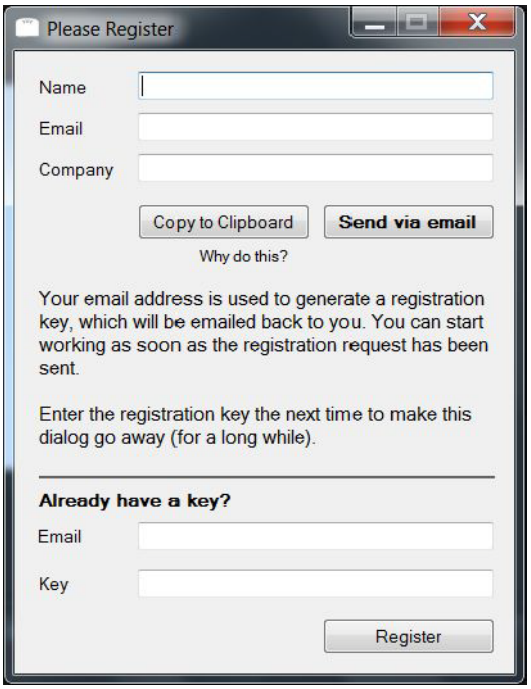
Please Register
Name
Email
Company
Copy to Clipboard
Send via email
Why do this?
Your email address is used to generate a registration key, which will be emailed back to you. You can start working as soon as the registration request has been sent.
Enter the registration key the next time to make this dialog go away (for a long while).
Already have a key?
Email
Key
Register

Figure 4-1 *Registration Window*

3. Complete the registration form and select **Send via email** to submit the request for a registration key.
4. Check your email account for your registration key.

5. Enter the registration key and click **Register**. The SessionOne main window opens.

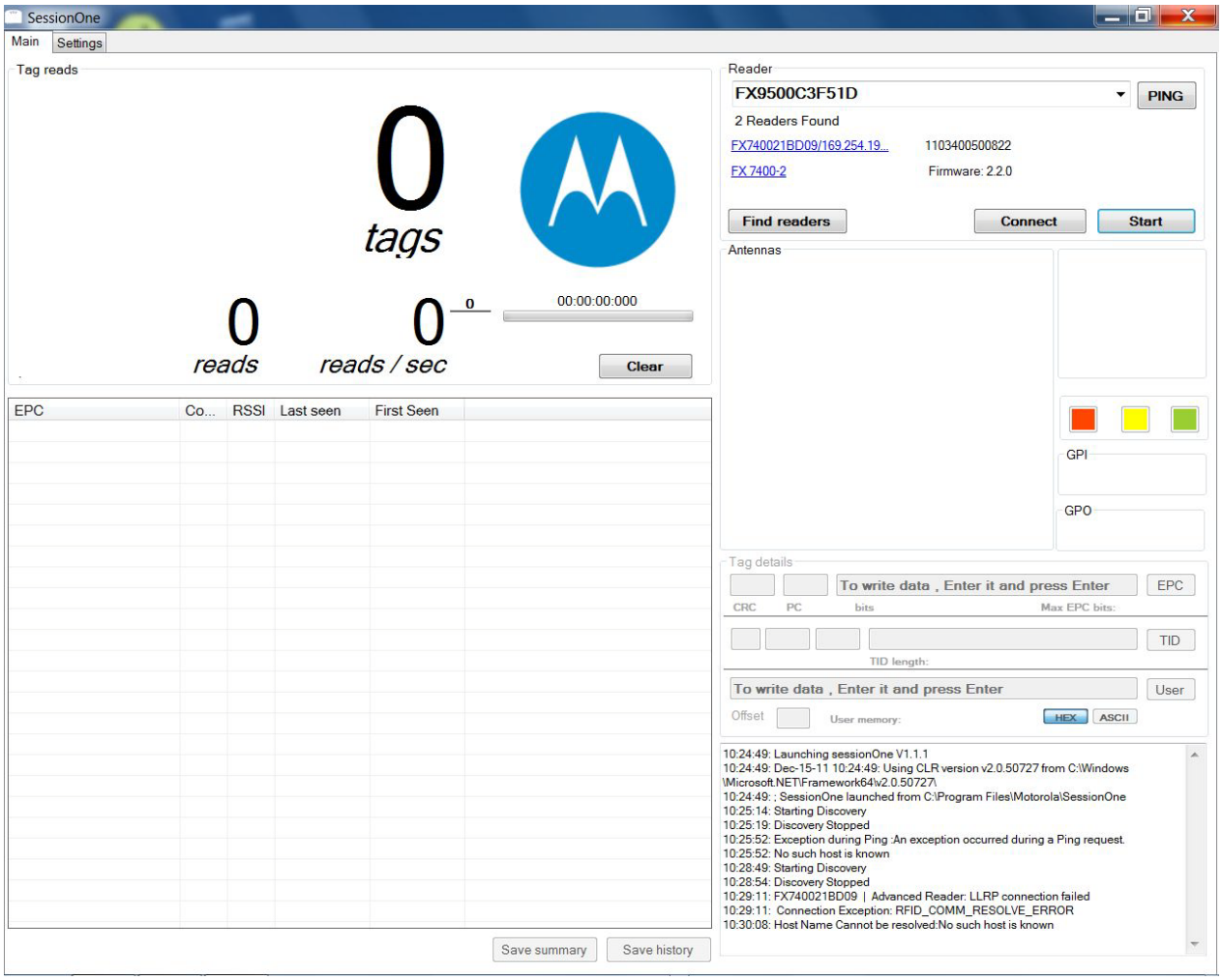

Figure 4-2 *SessionOne Main Tab*

6. Click **Find readers** to discover all readers in the area. Click on the reader name to connect to that reader, or select from the **Reader** text box/ drop-down list and click **Connect.**

NOTE If connecting to the host PC via a USB cable, note the following:
- To select a fixed reader, select **USB FX** | *friendly name* from the drop-down list.
- To select a handheld reader (MC3090-Z, MC3190-Z, or MC9090-Z), select **USB Mobile** | *friendly name* from the drop-down list.

See the next section if SessionOne does not locate the reader, or to search for a specific reader.

To use the host name to search for the reader:

1. Enter the reader host name in the **Reader** text box (e.g., fx7400cd3b0d) with no spaces. The host name is provided on a label on the reader, or on the CD provided with the reader. Click **Find readers**. The **Find readers** button changes to **Stop Finding** while SessionOne scans for a reader and displays connection activity at the bottom right area of the window.
2. When the message **Found Reader** appears, select the reader from the **Reader** drop-down list and click **Connect**.
3. Click **PING** to verify that the reader is connected. The button turns green to confirm connection. If the button turns red, continue to the following procedure.

If SessionOne does not find the reader:

1. Open a command prompt on the host PC by selecting **Start > Programs > Accessories > Command Prompt**.
2. Enter **ping** <*reader host name*> and press **Return**. For example, enter **ping fx7400cd3b0d** and press **Return**. Note the reader's IP address that displays.
3. Close the command prompt and return to SessionOne. Enter the reader's IP address in the **Reader** text box (e.g., **10.11.11.183**).
4. Click **PING** to locate and connect to the reader.

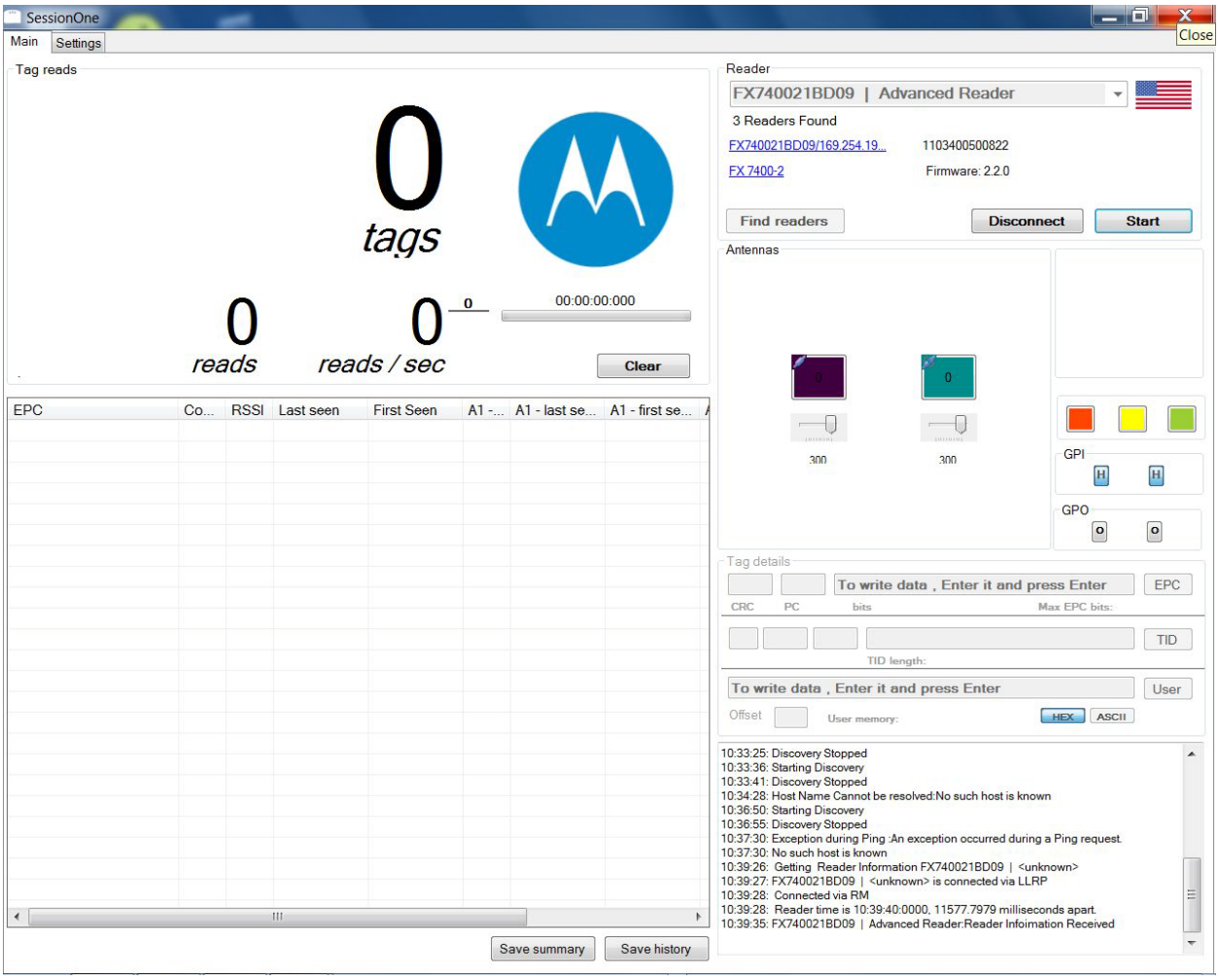

Figure 4-3 *SessionOne Main Tab - Reader Connected*

✓ ***NOTE*** After selecting a reader from the reader text box/drop-down list, if you select **Start** before selecting the **Connect** button, SessionOne automatically connects to the reader and begins inventory. Information related to the selected reader appears, including:
- Link to the reader URL
- Serial number or MAC address
- Reader model name and number
- Firmware version.

✓ ***NOTE*** If the reader does not read RFID tags, ensure the reader's region setting is configured. Refer to the reader's *Product Reference Guide* for instructions.

Reading Tags

Select **Start** to read tags in the area. The tags appear in the tag list. Select **Stop** to stop reading tags.

Main Tab

The **Main** tab includes the following fields.

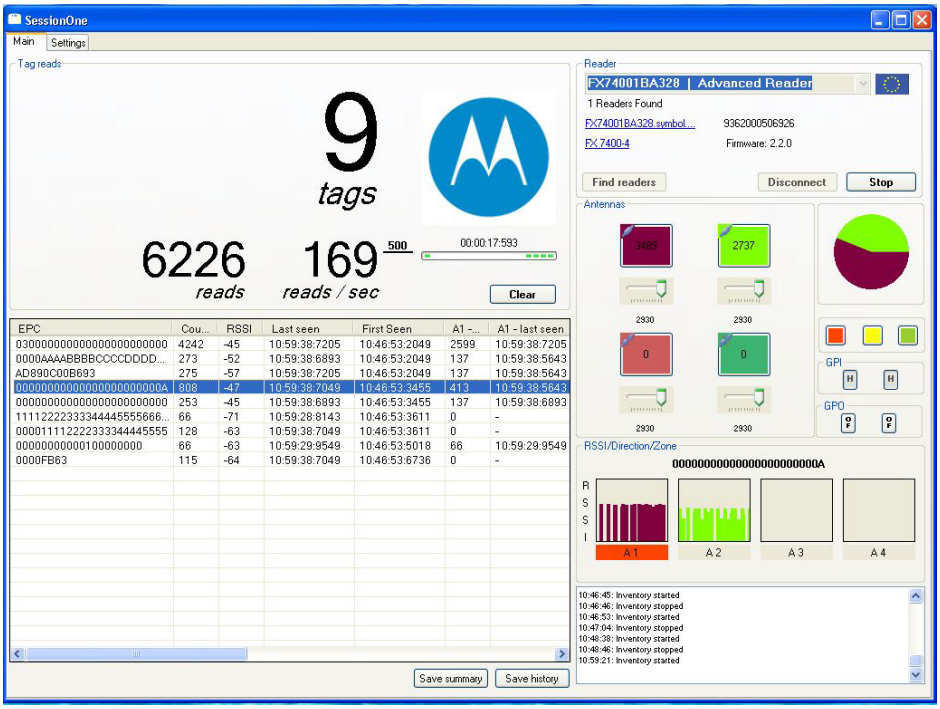

Figure 4-4 *Main Tab*

Tag Reads

This field includes the following items:

- **Tags** - number of tags read.
- **Reads** - total number of reads of all tags.
- **Reads / sec** - number of reads per second.
- **Time** bar - time elapsed in the current read session.
- **Clear** button - click to clear all tags from the list.
- Tag table - tracks tag read information:
  - **EPC** - unique tag EPC ID.
  - **Count** - number of times that tag was read.
  - **RSSI** - Received Signal Strength Indication.
  - **Last Seen** - UTC time (in microseconds) when the tag was last seen.
  - **First Seen** - UTC time (in microseconds) when the tag was first seen.
  - **A*x*** - number of times that individual antenna read the tag.
  - **A*x* Last Seen** - UTC time (in microseconds) when that antenna last saw the tag.
  - **A*x* First Seen** - UTC time (in microseconds) when that antenna first saw the tag.
- **Save summary** button - summarizes and saves the details of each tag read.
- **Save history** button - saves and stores the details of each tag read.

Reader

This field includes the following items:

- **Reader** text / drop-down box - enter the reader name, hostname, or IP address to connect to and press enter, or select from the drop-down list to view information related to the reader.
- **Ping** button - click to locate the reader in the text box. A successful ping appears in green and displays the round trip time of the ping in milliseconds.

  Upon a successful reader management (RM) login, clicking **Ping** also enables the reader's LED to light in green to indicate that reader was pinged.

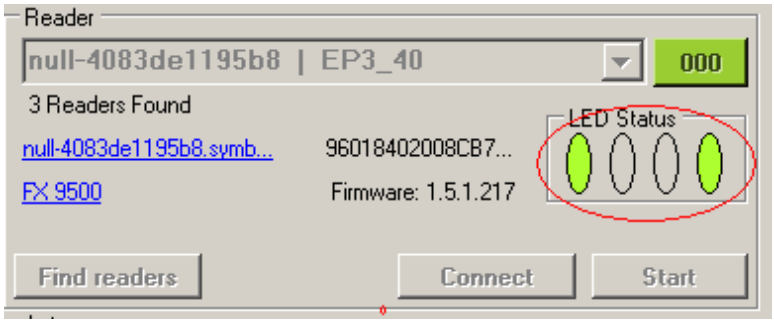

Figure 4-5 *Pinging Reader*

- **Readers Found** - lists all readers discovered in the area.
- **Find Readers** button - click to find all readers in the area.
- **Connect / Disconnect** button - click to connect to or disconnect from the selected reader. To connect to a reader, first select that reader from the drop-down list or enter the hostname/IP address, and then click **Connect**.
- **Start / Stop** button - click to start or stop reading tags.

Antennas

This field includes the following items:

- **Antennas** listed by color - each color represents an antenna port in the reader.
  - A blue icon on top of each antenna indicates whether the antenna is connected or disconnected.
  - An enabled antenna appears in the color selected in the **Settings** tab. A disabled antenna appears in the control color. To enable or disable an antenna, first ensure you are logged in with a valid user name and password, then click an antenna image. See *Autologin on page 4-11*.
  - Number value - the number inside each antenna indicates the total reads by that particular antenna.
  - Slide bar - the slide located under each antenna indicates the power level of each antenna. Use the slide bar to change the antenna's power value.
- Pie chart - represents the contribution of each antenna in total tag reads.
- User LED (small colored boxes under the pie chart) - the user LED colors available. The LED is set to a particular reader. To enable or disable the LED, first ensure you are logged in with a valid user name and password, then click an LED image. See *Autologin on page 4-11*.
- **GPI** field (General Purpose Input) - indicates the status of the **GPI** input.
- **GPO** field (General Purpose Output) - click on a **GPO** button to change the pin status of the device.

Tag Details

This field includes the following items:

- EPC - write tags and read the fields.
- TID - read only.
- User memory - read and write.

RSSI / Direction / Zone

This field is active when running inventory. Select a tag in the list to display the RSSI value for that tag in each antenna as a dynamic bar graph.

Settings Tab

The **Settings** tab includes the following fields.

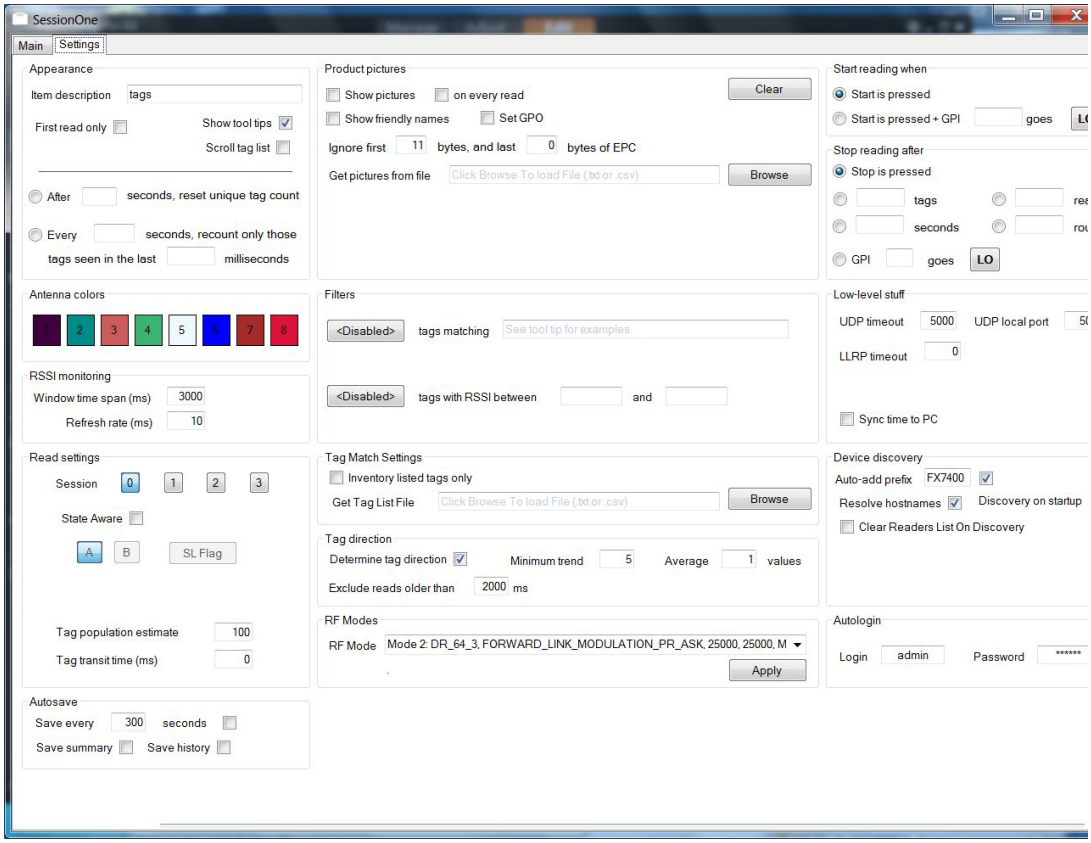

Figure 4-6 *Settings Tab*

Appearance

- **Item description** - enter text to appear in the **Main** tab below the unique tag reads count.
- **First read only** - check to update the list view in the **Main** tab only for the first read of the tag (no list view update for subsequent tag reads). Leave unchecked to update everything in the list view (all antenna details, RSSI values, etc.) For optimal performance, enable this option.
- **Show tool tips** - check to display tool tips for some controls.
- **Scroll tag list** - in a large tag environment where the tags exceed the display limit, check this to automatically scroll the list to ensure that the latest read tag is visible.
- **After** (text box) **seconds, reset unique tag count** - select the radio button, then enter the number of seconds after which the count of unique tags resets in the **Main** tab.
- **Every** (text box) **seconds, recount only those tags seen in the last** (text box) **milliseconds** - for the value entered in the first text box (in seconds), the unique tags count in the **Main** tab is set by the value of unique tags entered in the second text box (in milliseconds).

Antenna Colors

Select an antenna color to change the associated antenna's display color in the **Main** tab.

RSSI Monitoring

During tag inventory, select a tag to plot an RSSI graph for that tag.

- **Windows time span** - the time frame within which to consider RSSI values of the tag. Exclude any tag read older than this duration.
- **Refresh rate** - the time interval for refreshing or redrawing the RSSI graph.

Read Settings

- **Session** - specify the session of the reader.
- **State aware** - check to select state aware singulation.
  - **A, B** buttons - after checking **State Aware**, click to specify the inventoried flag value of the selected session (A or B).
  - **SL Flag** button - after checking **State Aware**, click to specify the flag (**SL**) state (asserted or deasserted).
- **Tag population estimate** - the expected tag population in the field of view of the antenna.
- **Tag transmit time** - the measure of expected tag mobility in the field of view of the antenna where this inventory operation is executed.

Autosave

This field includes settings for saving history or a summary.

- **Save every** - enter the time interval for autosave.
- **seconds** - check to save the tag list in the application data folder.
- **Save summary** - check to store consolidated summary for each tag instead of detailed reads in the application data folder.
- **Save history** - check to store detailed information on every read in the application data folder.

Product Picture

This field includes settings to show a picture in the **Main** tab where the Motorola logo appears during inventory.

- **Show pictures** - check to display the picture.
- **on every read** - check to display the picture on every read of the tag rather than on the first read only.
- **Show friendly names** - check to replace the tag ID in the list with a friendly name.
- **Set GPO** - check to enable GPO (if available in the loaded file).
- **Ignore first** (text box) **bytes, and last** (text box) **bytes of EPC** - specify which part of the tag ID to consider when comparing the tag ID read during inventory with the partial or full tag ID in the loaded file.
- **Get pictures from file** - click **Browse** to locate and load the .txt or .csv file. Each line of the file is in the format:
  <tag ID / part tag ID>,<Location of Image to Show>,<Friendly Name>,GPO<GPO number>

  For example:
  00,\pics\00.png,My Tag,GPO 1

Filters

- **Include/Exclude/Disable** field - choose whether to include/exclude/disable the filter.
- **tags matching** - enter the filter expression.
- **tag with RSSI between** (text box) **and** (text box) - enter the RSSI filter range.

Tag Match Settings

- **Inventory listed tags only** - check to load the file which contains the tag list to read.
- **Get Tag List File** - click **Browse** to browse tag lists. Select the tag list to inventory.

Tags listed that were read appear in green, tags not yet read appear in red. Inventory stops when all tags in the list are read.

Tag Direction

This field indicates the directionality of the tag if the tag appears in the bottom of the RSSI graph.

- **Determine tag direction** - check to enable this option.
- **Minimum trend** - enter the number of RSSI value averages to take to determine tag direction.
- **Average** - enter the number of RSSI values to take to calculate the average.
- **Exclude reads older than** - enter the time in which to exclude RSSI values for older tags read when determining the tag's direction.

RF Modes

Displays the RF mode set in the reader and allows the user to change this mode (applied to all antennas).

Start Reading When

- **Start is pressed** - select to start inventory upon clicking the **Start** button.
- **Start is pressed+GPI** - select to start inventory based on the GPI trigger. Enter the trigger (integer) in the text box.
- **goes** - select whether the required start trigger is **HI** or **LO**.

Stop Reading After

- **Stop is pressed** - select to stop inventory upon clicking the **Stop** button.
- **tags** - select to specify the number of tags after which to stop inventory.
- **reads -** select to specify the number of reads after which to stop inventory.
- **seconds** - select to specify the number of seconds after which to stop inventory.
- **rounds** - select to specify the number of rounds after which to stop inventory.
- **GPI** - select to stop inventory based on the GPI trigger. Enter the trigger (integer) in the text box.
- **goes** - select whether the required stop trigger is **HI** or **LO**.

Low Level Stuff

- **UDP timeout** - enter how long to wait to receive device discovery response information.
- **UDP local port** - enter the port in which the local host binds to send the device discovery message.
- **LLRP timeout** - set the timeout of the reader connection.
- **Sync time to PC** - check to synchronize the reader time with the local time.

Device Discovery

- **Auto-add prefix** - check to add an auto prefix while trying to resolve the hostname. For example, enter **FX7400**. Then, to connect to a series of FX7400XXXXX devices, search *XXXXX* only because *FX7400* is already included as an auto-add prefix.
- **Resolve hostnames** - check to resolve the hostname during device discovery.
- **Discovery on startup** - select to perform device discovery while the application is starting up.
- **Clear Readers List On Discovery** - check to discard discovered reader information when performing the next discovery.

Autologin

Enter the user name and password in these fields to log in to the device. Once logged in, the user can perform all reader management related operations, including enabling and disabling antennas and setting user LEDs.

CHAPTER 5 POWERSESSION

Introduction

PowerSession is a multi-reader, PC-based application used to discover and connect to multiple Motorola fixed and handheld RFID readers, specifically the FX Series Fixed Readers and MC Series Handheld Readers. This tool allows users to easily perform inventory operations.

Installation

To install PowerSession on the host PC:

1. Locate **PowerSession** at www.motorolasolutions.com/support.
2. Download the **PowerSession** zip file to the host PC and unzip the file.
3. Double-click on the **powersessionsetup.exe** file.
4. Follow the screen prompts to complete installation.

Connecting to the RFID Reader

To connect to the reader through PowerSession:

1. Connect the reader to the host PC. Refer to the reader's *Product Reference Guide* for instructions.

> ***NOTE*** If connecting to the host PC via a USB cable, note the following:
> - For the FX7400, ensure the USB mode is set to Network (the default mode). If the USB mode is ActiveSync, use the Administrator Console to change it to Network before connecting to the host PC.
> - For handheld readers, synchronize the device with the host PC.

2. Select **PowerSession** from the host PC **Start** menu to launch the application. The registration window appears.

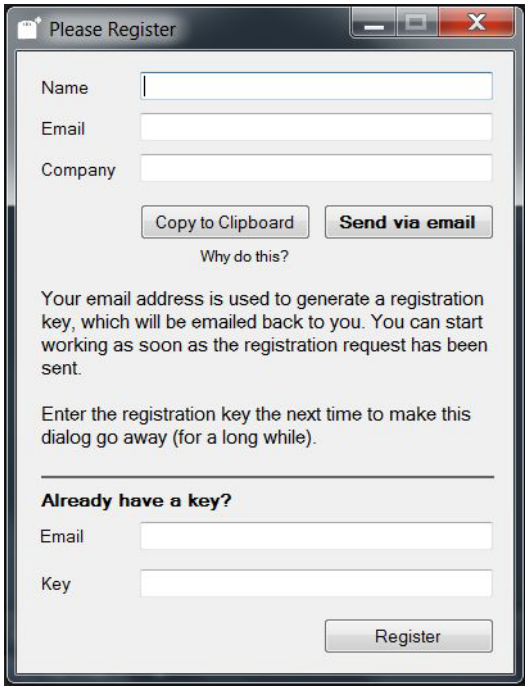
Please Register
Name
Email
Company
Copy to Clipboard
Send via email
Why do this?
Your email address is used to generate a registration key, which will be emailed back to you. You can start working as soon as the registration request has been sent.
Enter the registration key the next time to make this dialog go away (for a long while).
Already have a key?
Email
Key
Register

Figure 5-1 *Registration Window*

3. Complete the registration form and select **Send via email** to submit the request for a registration key.
4. Check your email account for your registration key.

5. Enter the registration key and click **Register**. The PowerSession main window opens.

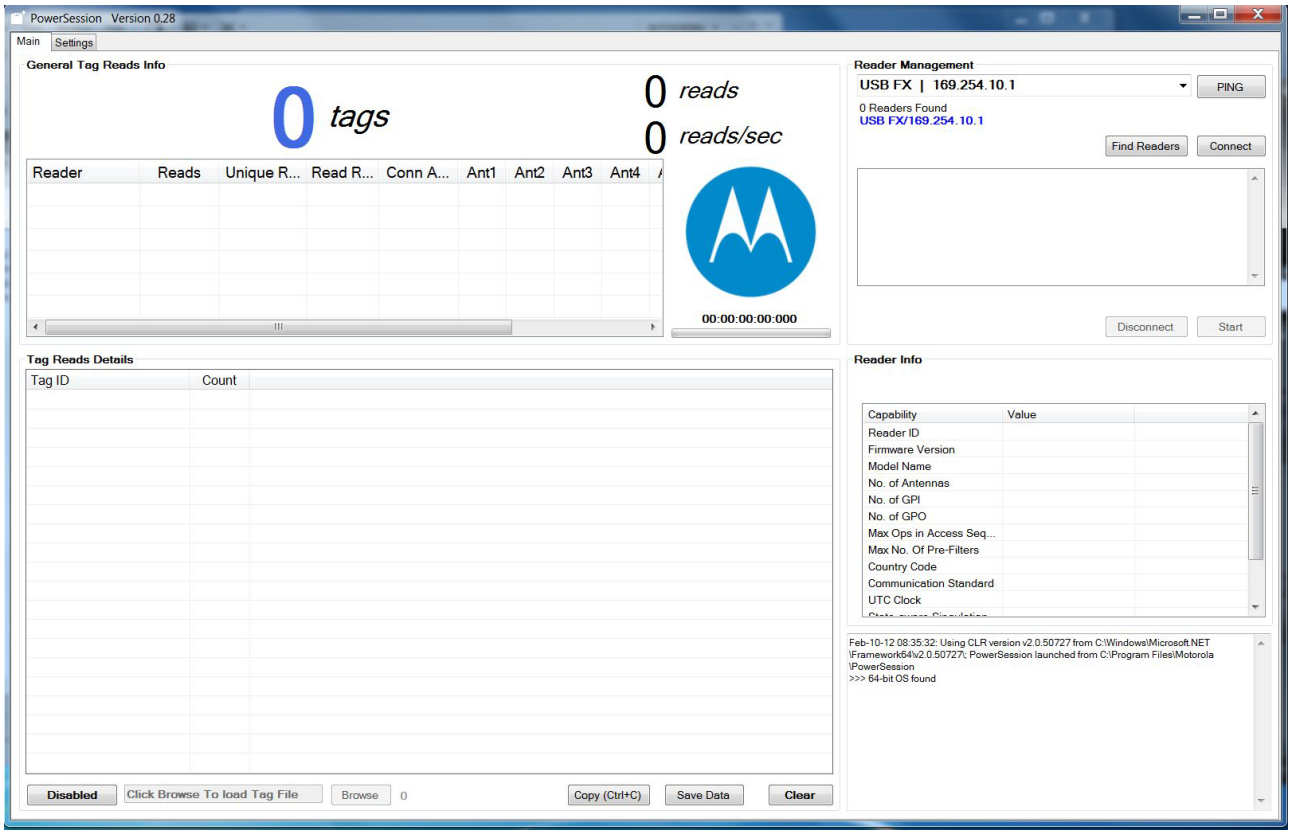

Figure 5-2 *PowerSession Main Tab*

6. Click **Find Readers** to discover all readers in the area. Click on the reader name to connect to that reader, or select from the **Reader Management** text box/ drop-down list and click **Connect.**

✓ ***NOTE*** If connecting to the host PC via a USB cable, note the following:
- To select a fixed reader, select **USB FX** | *friendly name* from the drop-down list.
- To select a handheld reader (MC3090-Z, MC3190-Z, or MC9090-Z), select **USB Mobile** | *friendly name* from the drop-down list.

See the next section if PowerSession does not locate the reader, or to search for a specific reader.

To use the host name to search for the reader:

1. Enter the reader host name in the **Reader Management** text box (e.g., fx7400cd3b0d) with no spaces. The host name is provided on a label on the reader, or on the CD provided with the reader. Click **Find Readers**. The **Find Readers** button changes to **Stop Finding** while PowerSession scans for a reader and displays connection activity at the bottom right area of the window.
2. When the message **Found Reader** appears, select the reader from the **Reader Management** drop-down list and click **Connect**.
3. Click **PING** to verify that the reader is connected. The button turns green to confirm connection. If the button turns red, continue to the following procedure.

If PowerSession does not find the reader:

1. Open a command prompt on the host PC by selecting **Start > Programs > Accessories > Command Prompt**.
2. Enter **ping** <*reader host name*> and press **Return**. For example, enter **ping fx7400cd3b0d** and press **Return**. Note the reader's IP address that displays.
3. Close the command prompt and return to PowerSession. Enter the reader's IP address in the **Reader Management** text box (e.g., **10.11.11.183**).
4. Click **PING** to locate and connect to the reader.

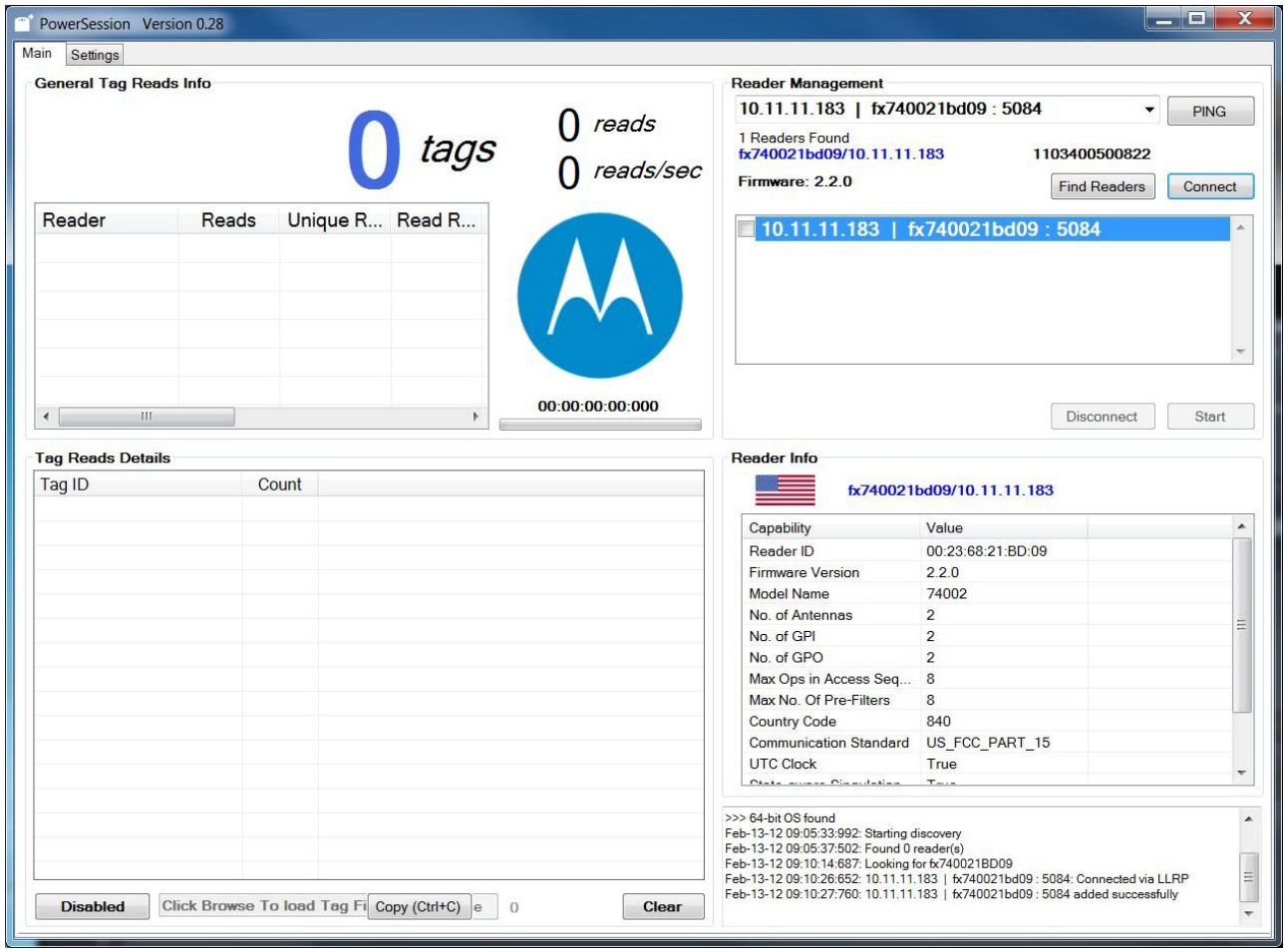

Figure 5-3 *PowerSession Main Tab - Reader Connected*

NOTE Select and connect to a reader before executing an inventory operation. Information related to the selected reader appears, including:
- Link to the reader URL
- Serial number or MAC address
- Reader model name and number
- Firmware version.

NOTE If the reader does not read RFID tags, ensure the reader's region setting is configured. Refer to the reader's *Product Reference Guide* for instructions.

Reading Tags

Select **Start** to read tags in the area. The tags appear in the tag list.

Select **Stop** to stop reading tags.

Main Tab

The **Main** tab includes the following fields.

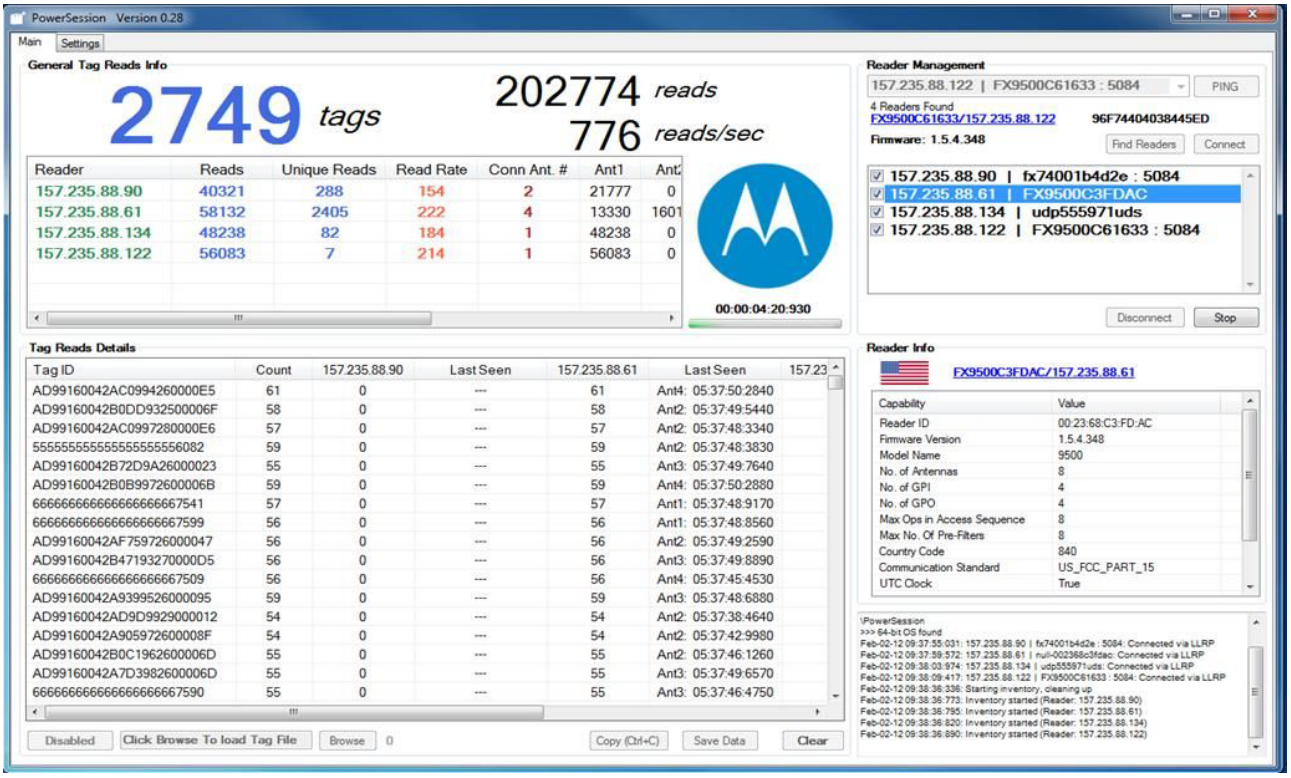

Figure 5-4 *Main Tab*

General Tag Reads Info

This field includes the following items:

- **Tags** - total number of unique tags read so far.
- **Reads** - total number of reads of all tags so far.
- **Reads / sec** - how many reads occur per second.
- **Time** bar - time elapsed in the current read session.

The table includes the following items:

- **Reader** - IP address of each selected reader.
- **Reads -** total number of reads of all tags so far.
- **Unique Reads -** total number of unique tags read so far.
- **Read Rate -** how many reads occur per second.
- **Conn Ant. # - Ant1-Ant 8** - number of antenna ports on the reader that are physically connected to antennas.

Tag Reads Details

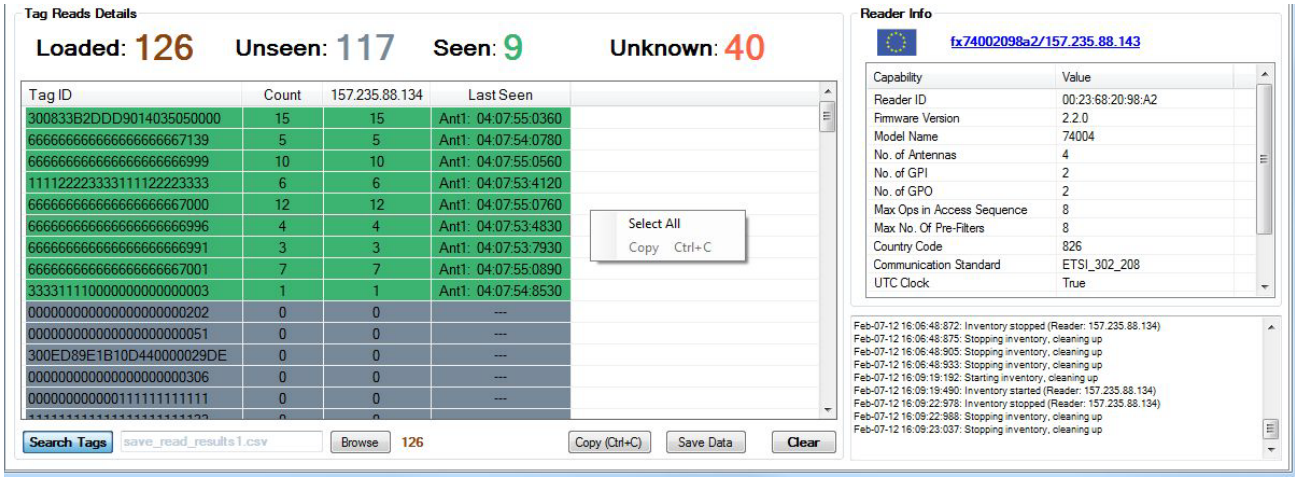

Figure 5-5 *Tag Reads Details*

This field includes the following items:

- **Loaded** - when the loading tag list functionality is enabled, this field displays the total number of tags loaded from a specific file that are expected to be seen.
- **Seen** - when the loading tag list functionality is enabled, this field displays the number of tags from the loaded tag list which the reader has seen so far.
- **Unseen** - when the loading tag list functionality is enabled, this field displays the number of tags from the loaded tag list which the reader has not yet seen.
- **Unknown** - when the loading tag list functionality is enabled, this field displays the number of tags that the reader has seen but are not included in the loaded tag list.
- **Tag ID** - unique tag ID.
- **Count** - number of times that tag was read.
- **IP Address** - IP address of each selected reader on which the inventory operation is executed.
- **Last Seen** - UTC time (in microseconds) when the tag was last seen.
- **Copy** button - click to copy and paste selected tag data records from the table into either a .txt or .csv file. Load this file later into PowerSession for a list of tags to search.

> ***NOTE*** You can also right-click on the **Tag Reads Details** table and use the pop-up menu to select and copy tag data records in the table.

- **Save Data** button - click to save the read results according to the current operation mode.
- **Clear** button - click to clear the current read results.

The searching tags section includes the following items:

- **Disabled/Search Tags** button - click **Disabled** to enable the loading tag list functionality. The button text changes to **Search Tags**.
- **Browse** button - click to load a tag file. The file can contain one tag ID per line. After each tag ID you can enter comments separated by commas.
- **Start** button - click to start searching tags.
- **Stop** button - click to stop searching tags.

Reader Management

This field includes the following items:

- **Reader Management** text box/drop-down list - enter the reader name to connect to, or select from the drop-down list, then press enter or click the **Connect** button. It also lists all readers discovered in the area.
- **Ping** button - click to check the connectivity of the selected reader. A successful ping appears in green and displays the round trip time of the ping in milliseconds.
- **Find Readers** button - click to find all readers in the area.
- **Connect / Disconnect** button - click to connect to or disconnect from the selected reader.
- Reader list - lists all readers connected to PowerSession.
- **Start / Stop** button - click to start or stop reading tags.

Reader Info

This field displays the reader capabilities information of a selected reader.

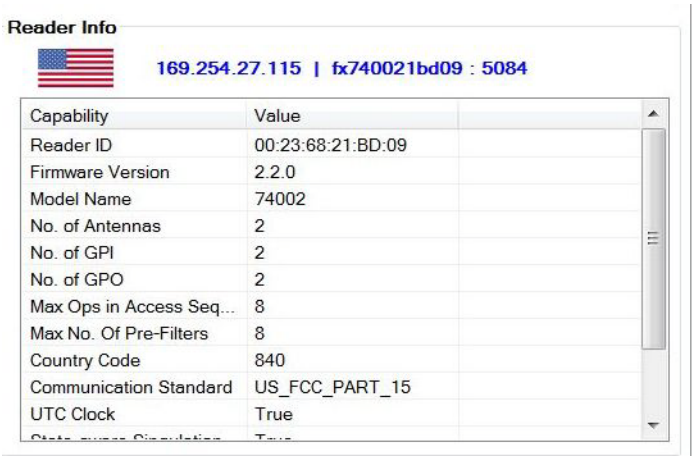

Figure 5-6 *Reader Info*

Settings

The **Settings** tab includes the following fields:

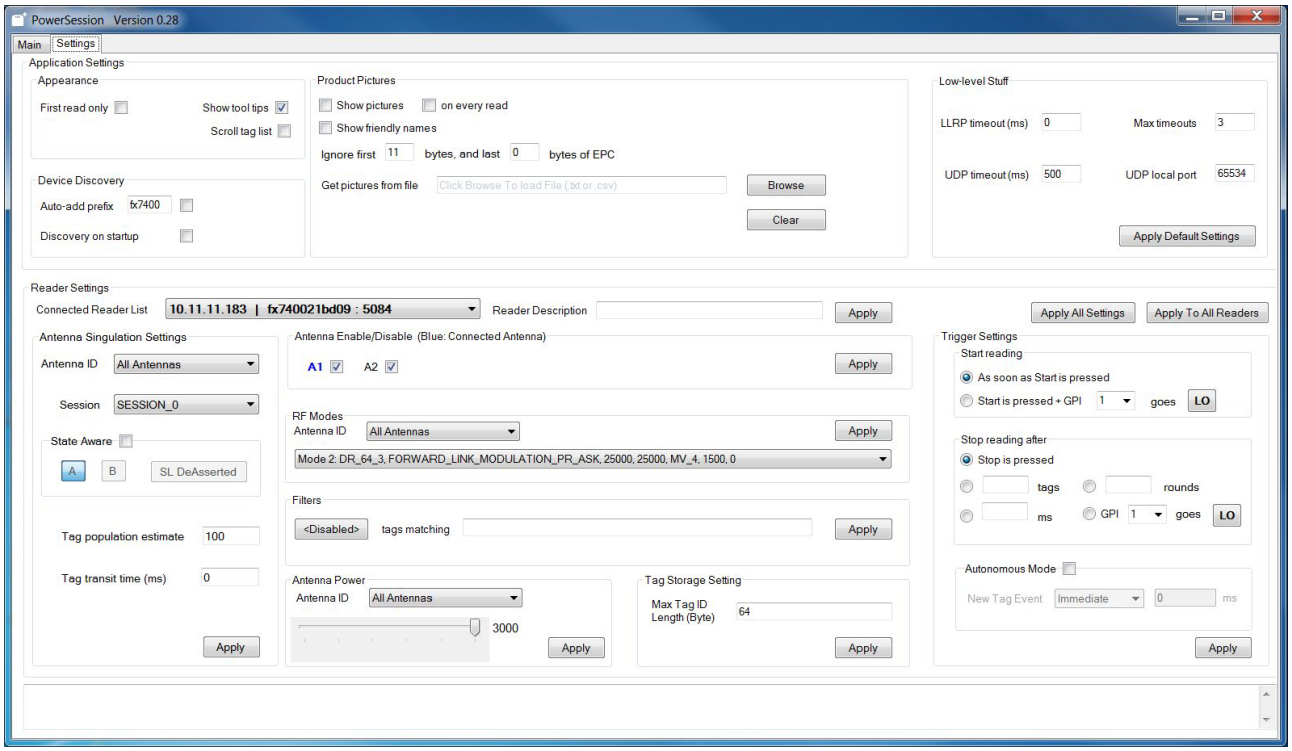

Figure 5-7 *Settings Tab*

Appearance

- **First read only** - check to update the list view in the **Main** tab only for the first read of the tag (no list view update for subsequent tag reads). Leave unchecked to update everything in the list view. For optimal performance, enable this option.
- **Show tool tips** - check to display tool tips for some controls.
- **Scroll tag list** - in a large tag environment where the tags exceed the display limit, check this to automatically scroll the list to ensure that the latest read tag is visible.

Device Discovery

- **Auto-add prefix** - check to add an auto prefix while trying to resolve hostname. For example, enter **FX7400**. Then, to connect to a series of FX7400XXXXX devices, search *XXXXX* only because *FX7400* is already included as an auto-add prefix.
- **Discovery on startup** - check to perform device discovery while the application is starting up.

Product Picture

This field includes settings to show a picture in the **Main** tab where the Motorola logo appears during inventory.

- **Show pictures** - check to display the picture.
- **on every read** - check to display the picture on every read of the tag rather than on the first read only.
- **Show friendly names** - check to replace the tag ID in the list with a friendly name.
- **Ignore first** (text box) **bytes, and last** (text box) **bytes of EPC** - specify which part of the tag ID to consider when comparing the tag ID read during inventory with the partial or full tag ID in the loaded file.
- **Get pictures from file** - click **Browse** to locate and load the .txt or .csv file. Each line of the file is in the format:
  <tag ID / part tag ID>,<Location of Image to Show>,<Friendly Name>

  For example:
  00,\pics\00.png,My Tag

Low Level Stuff

- **LLRP timeout** - set the timeout for the reader connection and the response from the reader (default is 0).
- **Max timeouts** - enter the maximum allowed UDP timeouts that occur sequentially before stopping discovery.
- **UDP timeout** - enter the time in ms to wait for device discovery response information.
- **UDP local port** - enter the port in which the local host should bind to send the device discovery message.

Reader Settings

- **Reader Description** - enter a description (up to 40 characters) for the selected reader, then click **Apply**. The description appears in the **Connected Reader List**, associated with that reader's IP address.

Antenna Singulation Settings

- **Antenna ID** - select whether to apply singulation settings to all antennas or a specified antenna.
- **Session** - specify the session of the reader.
- **State Aware** - check to select state aware singulation.
  - **A, B** buttons - after checking **State Aware**, click to specify the inventoried flag value of the selected session (A or B).
  - **SL Asserted / Deasserted** button - after checking **State Aware**, click to specify the flag (**SL**) state (asserted or deasserted).
- **Tag population estimate** - the expected tag population in the field of view of the antenna.
- **Tag transit time** - time in milliseconds that the tag typically remains in the RF field of the antenna where the inventory operation is running.

Antenna Enable/Disable

- **A(x)** check boxes - the number of antenna check boxes that appear equals the number of antenna ports that the reader supports. Check an antenna check box to perform inventory on this antenna port if it is physically connected to an antenna, then click **Apply**.

NOTE A blue antenna check box indicates that the corresponding antenna port on reader is physically connected to an antenna.

RF Modes

- **Antenna ID** - select whether to allow changing the RF mode for all antennas or a specified antenna.
- **RF Mode** drop-down list - lists the reader's supported RF modes and displays the mode currently set in the reader.

Filters

- **Include/Exclude/Disable** drop-down list - select a filter option.

NOTE Filtering is performed using pre-filters (up to the maximum allowed) and based on 96 bits EPC ID.
Because pre-filters are based on the current singulation settings, configure required singulation settings before applying filters.

Antenna Power

- **Antenna ID** - select whether to apply the antenna power setting to all antennas or a specified antenna.
- Antenna power slide bar - adjust the reader-supported antenna power values and click **Apply**.

Tag Storage Setting

- **Max Tag ID Length (Byte)** - specify the maximum storage size to allocate for a tag's EPC ID.

Trigger Settings

- **Start reading**
  - **As soon as Start is pressed** - select to start inventory upon clicking the **Start** button.
  - **Start is pressed + GPI** - select to start inventory based on the GPI trigger. Select the value representing the GPI trigger (integer) to use from the drop-down list.
  - **goes** - select whether the required start trigger is **HI** or **LO**.
- **Stop reading after**
  - **Stop is pressed** - select to stop inventory upon clicking the **Stop** button.
  - **tags** - select to specify the number of tags after which to stop inventory.
  - **rounds** - select to specify the number of rounds after which to stop inventory.
  - **ms** - select to specify the number of milliseconds after which to stop inventory.
  - **GPI -** select to stop inventory based on a GPI trigger. Select the value representing the GPI trigger (integer) to use from the drop-down list.
  - **goes** - select whether the required stop trigger is **HI** or **LO**.

Autonomous Mode

- **Autonomous Mode** - check to enable autonomous mode on the reader.
- **New Tag Event** - specify the new tag event mode for subscribing:
  - **Never** - report no tag data.
  - **Immediate** - report data for a new tag immediately.
  - **Moderated** - report data for a new tag only after the specified moderation time and that tag was seen for the moderation duration.
  - **ms** - when **Moderated** mode is selected, enter the moderation duration for the new tag event.

Chapter 6 RapidRead

Introduction

RapidRead is a RFID handheld reader application used to demonstrate inventory and asset counting, tag writing and item locating.

Installation

To install RapidRead on the handheld RFID reader:

1. Locate **RapidRead** at http://www.motorolasolutions.com/support.
2. Download the **RapidRead** zip file to the host PC and unzip the file.
3. Using Active Sync (XP) or Windows Mobile Device Center (Win7), connect the PC to the handheld reader.
4. On the handheld reader, open **File Explorer** and double click on the **Temp** folder (if the **Temp** folder is not visible, tap **Windows** icon > **File Explorer** > **Menu** > **Show All Files**).

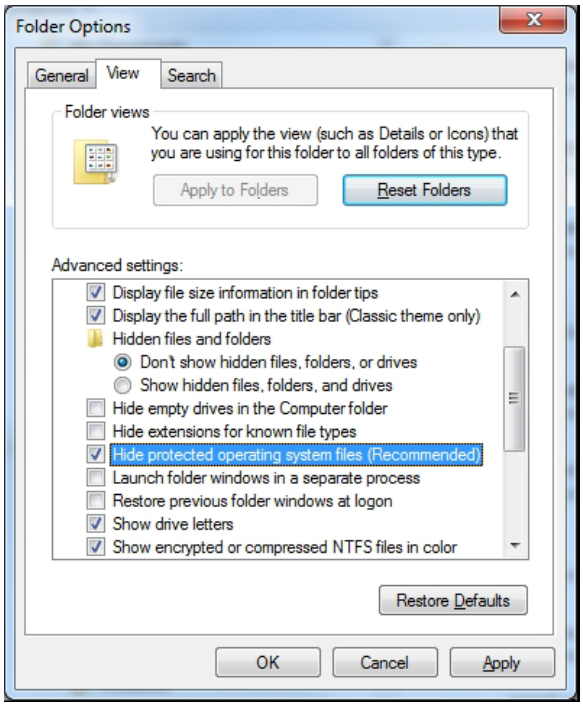
Folder Options
General
View
Search
Folder views
You can apply the view (such as Details or Icons) that you are using for this folder to all folders of this type.
Apply to Folders
Reset Folders
Advanced settings:
Display file size information in folder tips
Display the full path in the title bar (Classic theme only)
Hidden files and folders
Don't show hidden files, folders, or drives
Show hidden files, folders, and drives
Hide empty drives in the Computer folder
Hide extensions for known file types
Hide protected operating system files (Recommended)
Launch folder windows in a separate process
Restore previous folder windows at logon
Show drive letters
Show encrypted or compressed NTFS files in color
Restore Defaults
OK
Cancel
Apply

Figure 6-1 *Folder Options*

5. From the PC, copy the **CAB** file to the **Temp** folder on the handheld reader (if the **Temp** folder is not visible, tap **Tools** > **Folder Options** > **View** > uncheck the option **Hide protected operating system files** > select **Yes** > tap **Apply**).
6. On the handheld reader, tap on the **CAB** file to install.
7. When prompted, select **Device** for installation directory.

To access RapidRead, double tap the **RapidRead** icon on the home screen of the handheld reader or select **File Explorer** > **Program Files** > **RapidRead**.

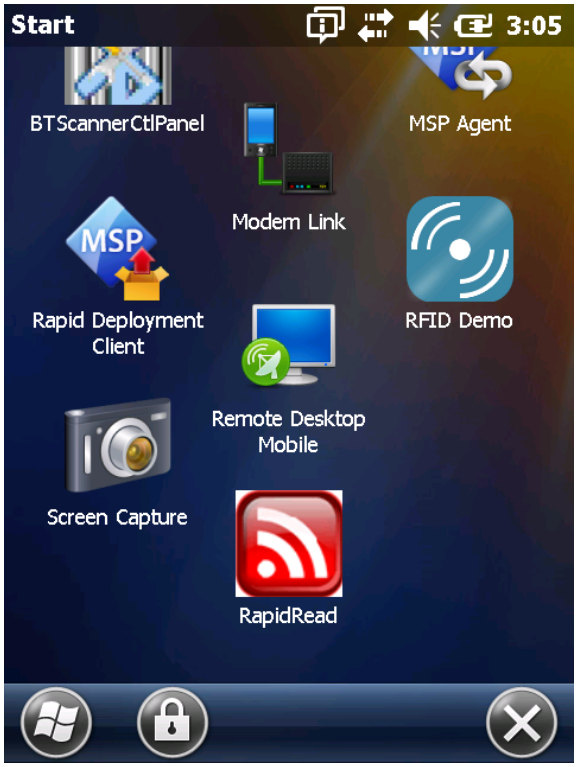

Figure 6-2 *RapidRead Icon*

Options

To select specific options, select **Menu > Options.**

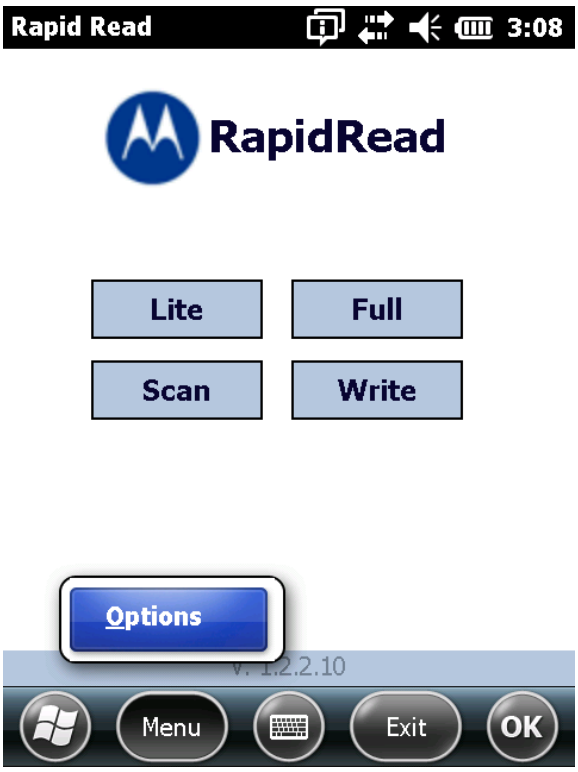

Figure 6-3 *RapidRead Menu*

The following selections are available on the **Options** screen:

- Scan Sounds (applicable for Lite and Full) - check to produce a sound for unique tag reads only, rather than on each tag read.
- Tag (applicable for Lite only) - check to display tag reads in SGTIN-96 format.
- Barcode - check to display number of unique bar codes read rather than the total number of bar codes read.
- Unknown Tags (applicable for Full only) - check to show tags which are not in the database but have been read.

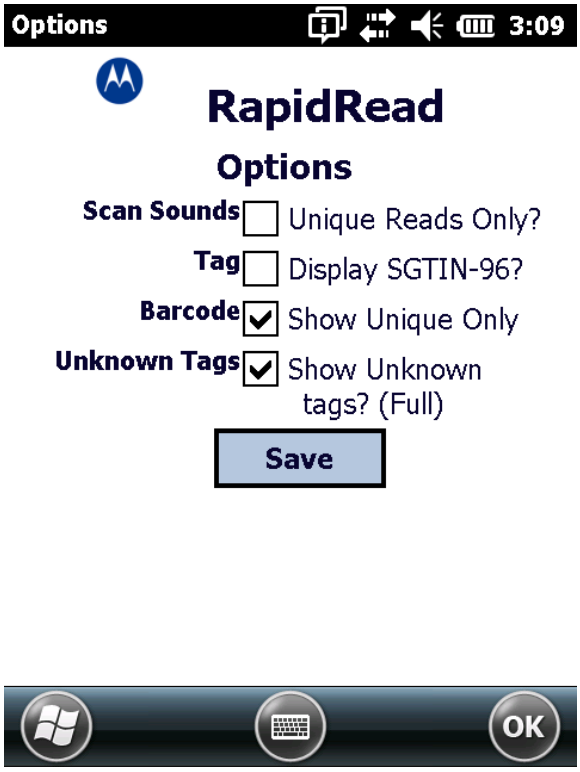

Figure 6-4 *RapidRead Options Screen*

RapidRead Tag File

RapidRead has the ability to read and compare against an onboard tag database (tags.csv) displaying matching results, missing and unknown items that have been read during a session.

To implement after installation is complete:

1. Locate the **tags.csv** file in the **RapidRead** application folder (under **Program** files) on the handheld reader.
2. While connected to the PC through ActiveSyc or Windows Mobile Device Center, copy the **tags.csv** file from the handheld reader to desktop.

> ***NOTE*** The **tags.csv** file is a database of tagged inventory and is comma delimited without header information.

3. Using a simple text based application such as, Microsoft® Notepad, modify the file to match your specific tag EPC numbers and enter **Item Descriptions**. Separate the EPC number and item description with a comma per line for each 'valid' tag.
4. When complete, save the **tags.csv** file to your PC and copy the file back to the handheld reader, replacing the original file.

> ***NOTE*** The tag file must be renamed **tags** as it is the only database name that the handheld reader recognizes.

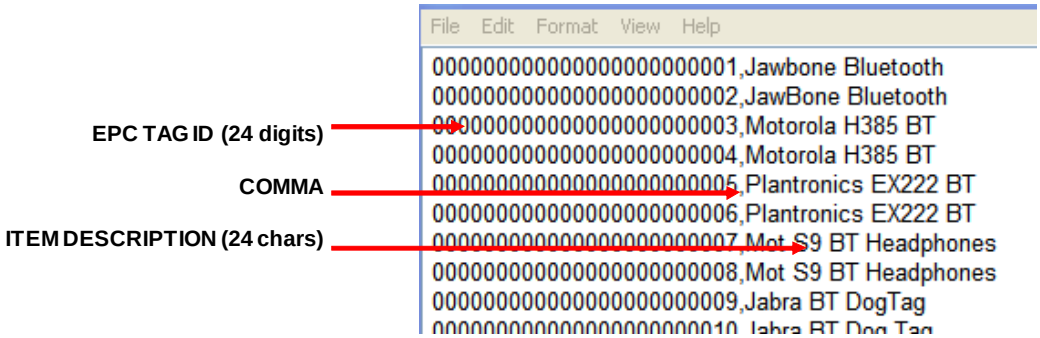

Figure 6-5 *Sample List of Tags*

Using RapidRead

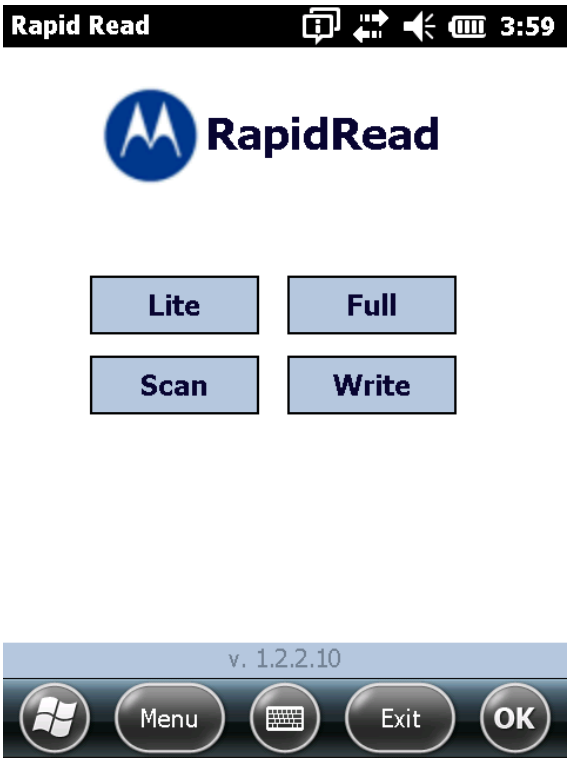

Figure 6-6 *RapidRead Main Screen*

The four modes of operation are as follows:

- Lite – read all tags in read range via RFID.
- Full – read all tags in read range via RFID; compare against database (tags.csv).
- Scan – bar code scanning (functions on both RFID enabled handheld as well as non-RFID handheld).
- Write – function to encode RFID tags by key entry, bar code scanning, or STGIN-96.

RapidRead Lite

RapidRead Lite offers the following features:

- Ability to scan all standard EPC class1 GEN2 tags within read range and display tag reads.
- Display EPC number read.
- Display number of times a particular tag has been read.
- Display unique tag count.

Summary Screen

The Summary screen displays the number of unique tags read.

Figure 6-7 *RapidRead Lite Summary Screen*

RFID Read occurs only when the trigger is engaged.

Detail Screen

Select the **Detail** tab to display a list of individual reads. To clear the list, tap the **Clear List** button.

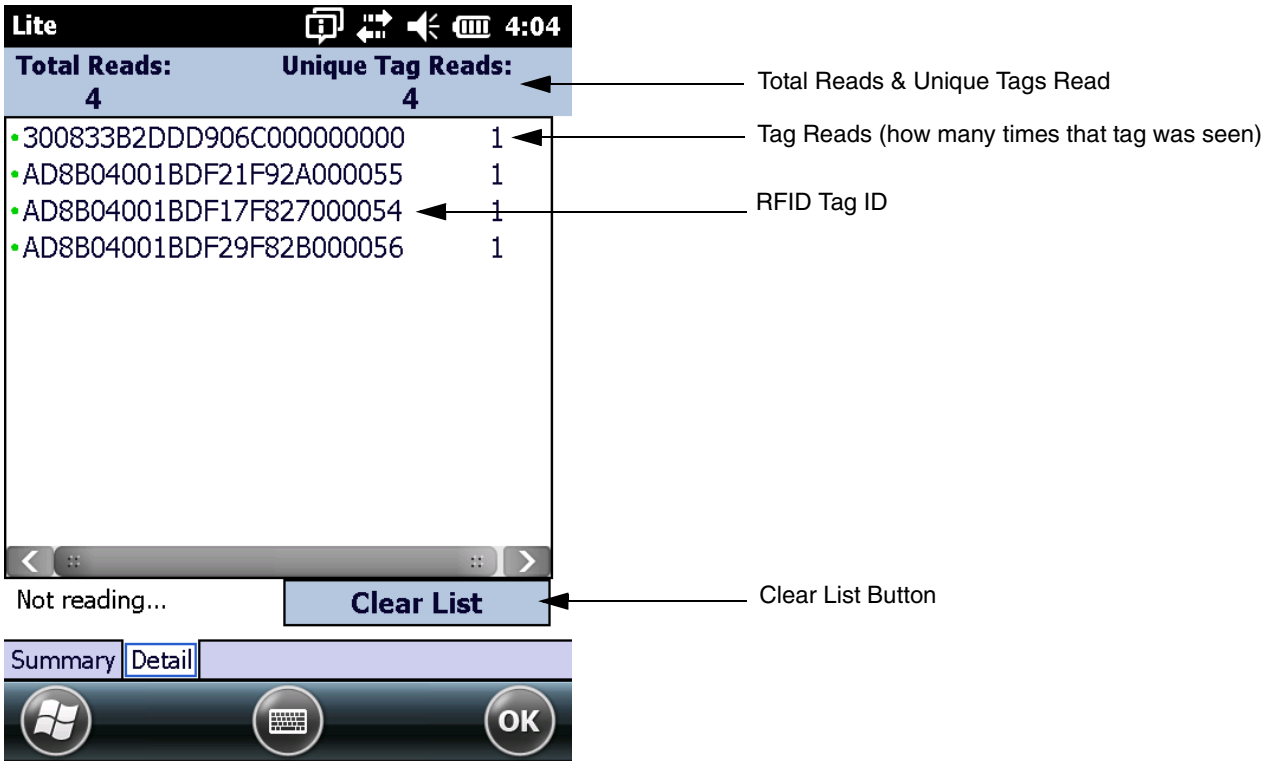

Figure 6-8 *RapidRead Lite Detail Screen*

NOTE If SGTIN-96 format is selected, tags not in valid SGTIN-96 format appear in HEX format.

NOTE If the reader display cannot accommodate the tag ID length, the application displays only a portion of the tag ID. Select the tag ID to open a window that displays the entire ID.

RapidRead Full

RapidRead Full offers the following features:

- Ability to scan all standard EPC class1 GEN2 tags within read range and display tag reads.
- Validate read against the tag database (tags.csv) in the RapidRead application folder.
- Display associated asset configurable description.
- Display number of times a particular tag has been read.
- Display total read and unique tag read counts.
- Visual and audible feedback to assist in locating a particular tag (Geiger counter).

Summary Screen

The Summary screen displays the number of unique tags read.

Figure 6-9 *RapidRead Full Summary Screen*

RFID Read occurs only when the trigger is engaged.

Detail Screen

The color coded indicators (located next to the titles) are defined as follows:

- Green - read is a match to an asset that has been defined in the tags.csv file.
- Yellow - expected tag but has not been read.
- Red - read does not have a match in the tags.csv file and is classified as unknown.

Select the **Detail tab** to display a list of individual reads. To clear the list, tap the **Clear Data** button.

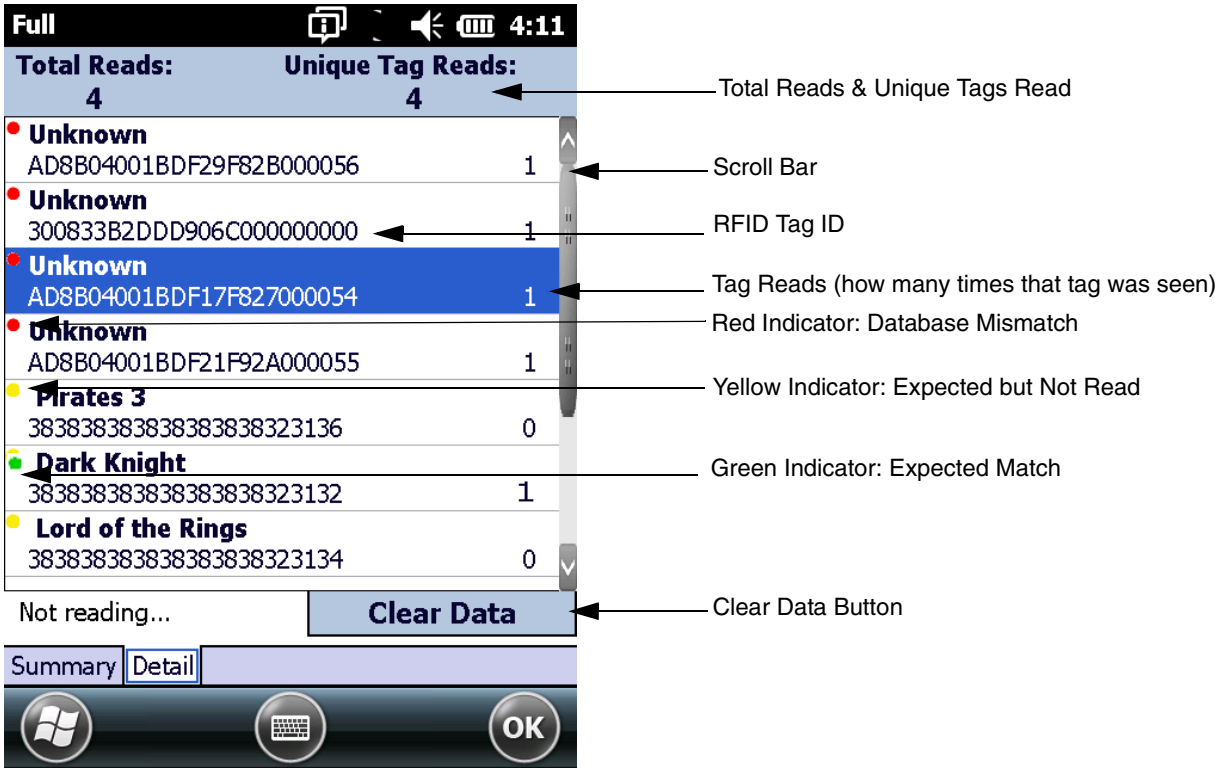

Figure 6-10 *RapidRead Full Detail Screen*

Gieger Counter

The Gieger counter is a tag locator application that assists with locating missing items (applicable to RapidRead Full only). To use the Gieger counter feature:

1. Select the **Detail** tab.

Figure 6-11 *RapidRead Full Detail Tab*

2. Tap one of the missing items. The Geiger Counter screen opens as displayed in *Figure 6-12*.

3. Pull the handheld trigger and begin to slowly move the reader around. As the reader approaches the item, beeping frequency increases and the visual bar on the screen will become larger.

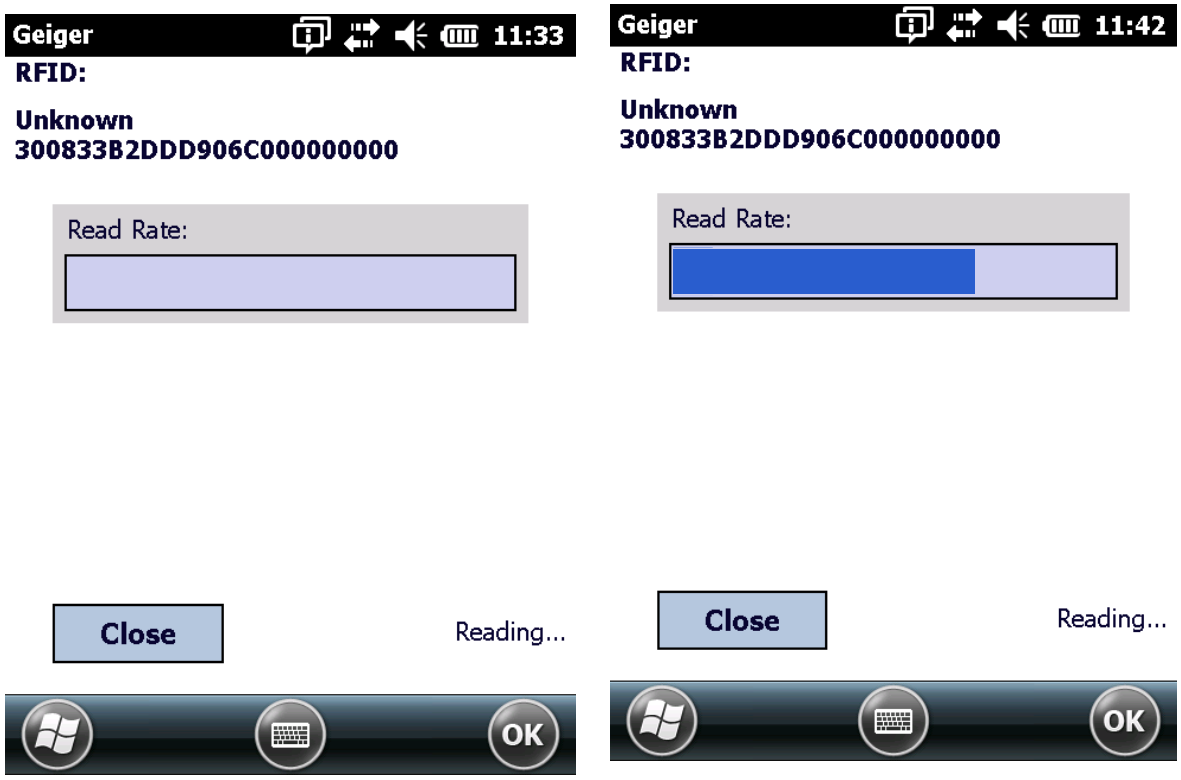

Figure 6-12 *Gieger Counter Read Rate*

RapidRead Scan

RapidRead Scan offers the following features:

- Ability to scan bar code.
- Display bar code read.
- Display number of times a particular bar code has been read.
- Display unique bar code count.

NOTE RapidRead Scan mode also functions on a non-RFID handheld devices as well.

Summary Screen

Bar code read occurs only when the trigger is engaged. The Summary screen displays the number of unique bar codes read.

Figure 6-13 *RapidRead Scan Summary Screen*

Detail Screen

Select the **Detail** tab to display a list of individual reads. To clear the list, tap the **Clear List** button.

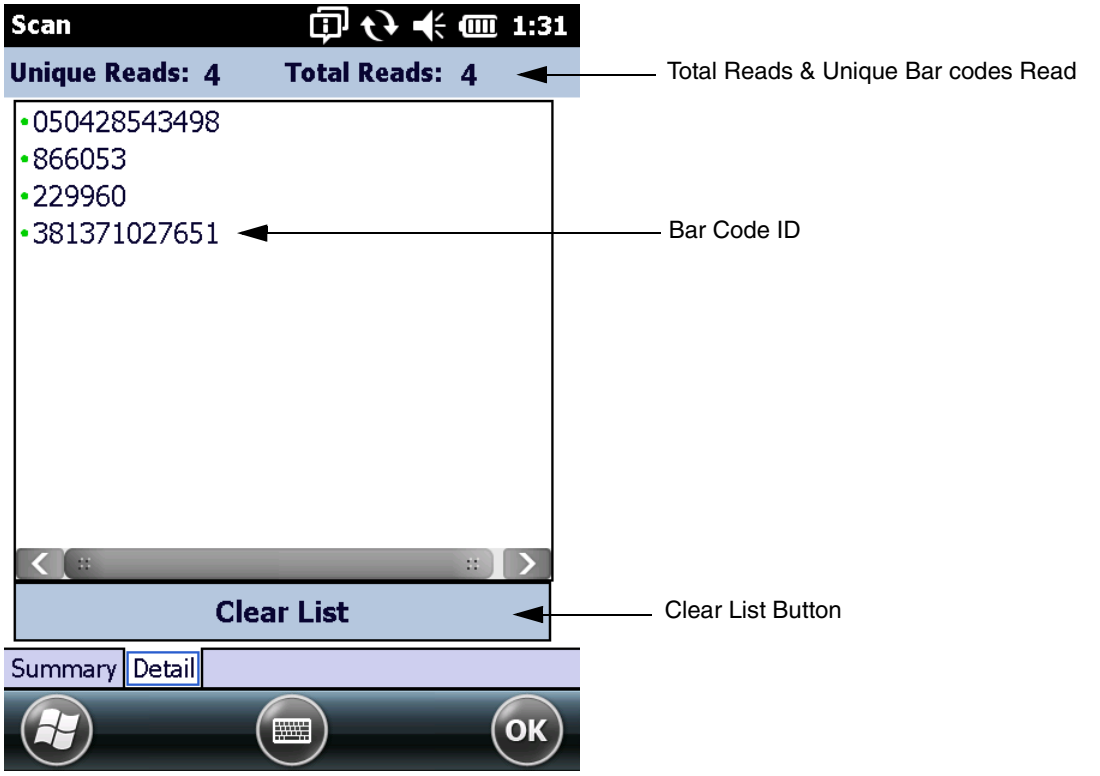

Figure 6-14 *RapidRead Scan Detail Screen*

RapidRead Write

The RapidRead Write methods of input are:

- Key entry
- Scan a bar code
- STGIN-96

Key Enter Tab

To write to a tag via key entry:

1. Enter 24 digits representing the RFID tag ID.
2. Check **Auto-increment** to increment the entered number by one digit for the next tag encode.
3. Tap the **Write Tag** button to write the information to the tag. Once encoded, a successful encode message will be displayed on screen.

Figure 6-15 *RapidRead Write Key Enter Screen*

Bar Code Tab

To write to a tag via bar code scan:

1. Scan a bar code to enter the bar code data in the text field. Leading zeros are added to the front of the ID if the bar code contains less than 24 digits.
2. Tap the **Write Tag** button to write the information to the tag. Once encoded, a successful encode message will be displayed on screen.

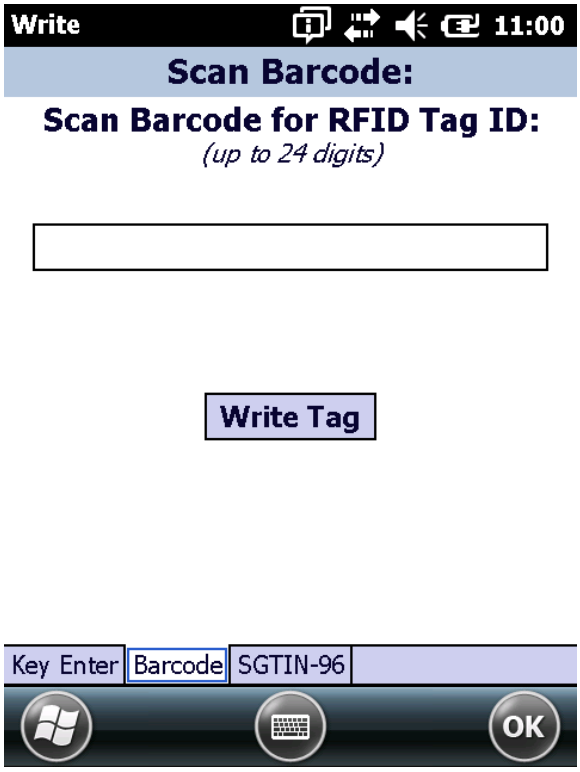

Figure 6-16 *RapidRead Write Barcode Screen*

STGIN-96 Tab

Populate fields with appropriate information.

1. Enter filter data in the **Enter FILTER** field.
2. Enter partition data in the **Enter PARTITION** field.
3. Scan the corresponding UPC bar code in the **Scan UPC** field.
4. Tap the **Write Tag** button to write the information to the tag. Once encoded, a successful encode message will be displayed on screen.

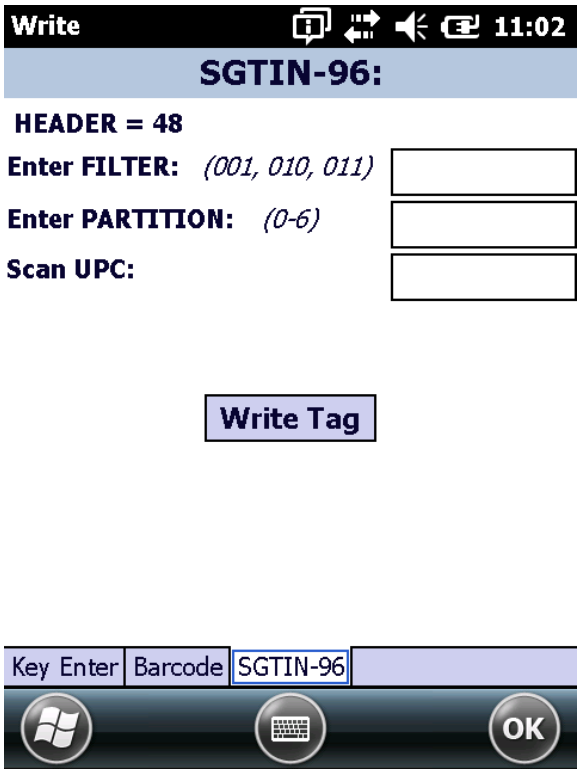

Figure 6-17 *RapidRead Write SGTIN-96 Screen*

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What topics need to be added to the index, if applicable?

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72E-160038-01 Revision A - May 2012